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DIAGNOSIS OF GASTRIC ULCER WITH DIFFERENTIAL DIAGNOSIS.*

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Ulcers of the stomach and duodenum have a definite symptomatology. When they are located in the duodenal and pyloric areas, it is usually clear-cut and simple. When they are located in the pyloric end of the stomach or along the lesser curvature, we do not usually find marked variation in the course of the symptoms, but it is a fact that as the lesion is found farther and farther from the pylorus the symptoms may lose some of their clear-cut significance, and fail to give that almost pathognomonic course of the duodenal form. However, in the great number of peptic ulcers the type of symptom is fairly suggestive, and a careful development of the history will lead closely, not only to a good diagnosis, but often to a degree of precision in ulcer location.

What, then, is this train of symptoms that so closely typifies ulcer of the stomach? Consider, first, its chronicity. The patient rarely fails to relate clearly and precisely that it has been many years since he first began to experience gastric disturbance, mild perhaps in its beginning, of short duration and but little disturbing to his general health and usefulness. He will tell us that, as the years have gone by, the trouble has been of the same type, has gradually increased in severity until finally he has little or no relief. This period of chronicity varies from one to twenty years, often running thirty to forty-five. The average number of years in our series is between twelve and thirteen. The second characteristic feature and one usually clear to the patient is the periodicity of attacks. Early in the disturbance he may say the spells came spring and fall, and were not severely annoying. That they came

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most often without discoverable cause, suddenly and continued days or weeks without interruption. Each day of the attack was a repetition of the preceding, each meal producing the same effect—first, comfort for one to five hours, then pain, gas, sour stomach and vomiting. Following these more or less prolonged spells came periods of relief, often suddenly, without known cause, or following a vacation or change of vocation. The periods of attack and relief alternate at irregular intervals for years, and continue for varying periods. The intermission gradually decreases; the attacks come oftener, increase in severity perhaps but slowly until the severer complications have crippled the efficiency of the stomach. Then the patient fails to reach at any time his normal condition, and may have no cessation of symptoms.

Are chronicity and periodicity peculiar to ulcer of the stomach? We find in gall-bladder disease, appendiceal colics and many general diseases, this chronicity and this periodicity. Gallstone and appendiceal attacks come irregularly, increasing in severity as attacks multiply. They appear and disappear suddenly, with the cause often as obscure as in ulcer. The so-called cure in each is only a part of the round of trouble. It is (1) the character of the attack, and (2) the peculiar manifestation of the separate accompanying symptoms that call for consideration in differentiation.

Let us consider the symptoms which accompany an attack of gastric ulcer; first, pain—this is the most constant symptom, in the absence of which some clinicians say we must not diagnose ulcer. Pain is usually epigastric and its field of radiation limited. It may be burning, gnawing, lancinating, mild or extremely severe, depending on location, extent and depth of ulceration, amount and degree of acidity and the persistence of accompanying spasm. Gas is usually present and varies from mild pressure to most extreme annoyance; usual also are sour eructations, water brash, vomiting of more or less intensely sour, acrid, bitter-burning fluid, which may be mixed with food. Some or all of these symptoms accompany an attack and each may be characteristic of ulcer, when considered in its peculiar relation to time. May not any or all of these symptoms be present in gallstone trouble or appendiceal attacks? All three—ulcer, gallstones, appendicitis—have pain which may be epigastric only, with any degree of severity. There may be gas, vomiting, sour eructations and acidity of the stomach complained of in all. Then chronicity, periodicity, pain, vomiting and gas are not of themselves characteristic of gastric ulcer. It is not the location of the pain that tells the story; it is not the kind of pain, nor its severity that points the way; it is not the presence of all, nor the severity of the several accompanying symptoms that makes pain, but it is (1) the *time* of pain or other symptoms, it is (2) the *regularity* of pain and other symptoms, and it is (3) the *means* by which the pain or other symptoms are relieved, that give the differential characteristics to gastric ulcer.

During a period of attack in gastric ulcer—an attack, the duration of which may be days or weeks—the patient complains more or less severely of pain, gas, vomiting, sour eructations, heartburn and sour stomach; he will say it follows meals, but it will be often found more

exact to say before meals. Usually one to five hours after a hearty meal the symptoms return, increasing in intensity until vomiting or irrigation has removed the acrid, acid material, or it has been neutralized by soda, or, as is more usual, until food is again taken. More or less complete ease follows food and drink, the heartier the meal the more pronounced and prolonged the comfort. Especially is this noticed early in the history, and when the ulcer is closely pyloric. This train of symptoms repeat daily during the period of attack with certain regularity after meals. This time after food varies but little for different individuals; indeed, is peculiarly exact for each. Just as surely and regularly as these symptoms present themselves are they controlled by food, drink, alkalies, vomiting or irrigation, until complications have changed the character of the disease. This peculiar cycle within the cycle is the characteristic of ulcer. Pain is the most constant factor, but ulcer may be present without pain. If gas, vomiting, distress or sour stomach is present, and appears and disappears with characteristic regularity before meals and after meals, then ulcer should be strongly suspected, even in the absence of pain. This type of symptomatology may be approached in hyperacidity, hypersecretion, some appendiceal conditions and the like, but there is no pathological condition that closely follows this train of symptoms, except ulcer of the pyloric end of the stomach. We believe that of all pathological conditions that approach pathognomonic symptoms none more closely reaches that rank than does uncomplicated ulcer at the gastric outlet.

These pathognomonic symptoms lose force if the position of the ulcer be cardiac, or on the greater curvature near the fundus, when the symptoms then are usually quite immediate. In end conditions as (1) wide destruction, (2) hour-glass stomach, (3) extensive saddle ulcers, (4) perforations and adhesions, and (5) in stenosis, there is a persistency of symptoms developed and the peculiar differential type is lost. There is pain, often severe, quite continuous, and it not only does not yield to food as before, but it is increased immediately, or nearly so, by it. Vomiting becomes irregular and more intense, though perhaps less frequent. The quantity increases and may be exceedingly acid and contain remnants of former meals. Gas appears at any or all the time, and is often distressing. The patient finds ease through careful diet, or finds the greatest comfort when the stomach is empty, rather than when filled. When these complicated pathological conditions exist, our difficulties are multiplied, because this latter group of symptoms is not peculiar to primary ulcer lesions. It is, however, common to its complications, to chronic gallstone cases, to cancer of the stomach, chronic appendicitis, pancreatitis, angina pectoris, kidney lesions and in many general systemic diseases. Therefore, in order to make a differential diagnosis, turn back to the carefully determined early history.

Complications: Perforation is not infrequent and is acute or chronic. The former is less often met and, when the anterior wall is the seat of perforation, untreated cases show a large mortality. Posterior perforations find protection and oftener become chronic. In acute perforations the pain is intense and calls for large doses of morphin, which may fail

to stay the pain. These perforations simulate acute gall-bladder infections or perforations, and may be mistaken for acute appendiceal attacks. The early pain is quite often near enough McBurney's point to mislead, if the examination be cursory.

Chronic perforation is frequent, and causes adhesions to neighboring organs, reduces the motility of the stomach, which, in turn, decreases motor power and increases secretion. This increased secretion adds to the obstruction by causing pyloric spasm, while the spasm again heightens acid secretion, increases the pain and threatens deeper ulceration. This action and reaction increases difficulties in diagnosis, as well as in treatment. These chronic perforations develop chronic symptoms, and each perforation may give us sudden, sharp attacks of peritonitis. When the ulcer is posterior these attacks are so closely allied to chronic gallstone colics that present symptoms alone will not furnish means of diagnosis.

Cicatricial formations are the commonest complications, and cover obstruction, hour-glass stomachs and other deformities. As a rule, obstruction is not difficult to establish. The usual symptoms of ulcer increase and become chronic. Emaciation and constipation are present. Vomiting of delayed food masses or remnants found at test meal are usually conclusive evidence. Hour-glass stomach and other deformities, due to adhesions, contractures and band formation, have chronic symptoms and, like pyloric stenosis, produce retention, stagnation and obstruction, but the symptoms are not characteristic. In thin-walled patients the outline of the stomach may be seen upon inflation and occasionally a diagnosis made. The vomitus may contain food at first, then become clear, later food particles appear, though no food be taken during the period of attack; or the cardiac cavity may be thoroughly irrigated, clear water returned and then suddenly food particles appear. Again, the splashing sound noticed by Jaworski may show fluid in the stomach which can not be withdrawn because it is in the pyloric cavity. We find slow progress in the diagnosis of the actual underlying condition, but the chronicity and serious phases point directly to surgical interference, which should clear up the diagnostic difficulty and give gastric relief.

Hemorrhage is not so frequent as formerly thought; at least, hemorrhage that calls for radical interference. Large areas with its continual oozing lead to anemia, and with the serious and chronic symptoms that accompany we are not greatly delayed in deciding the condition. Bleedings that are copious bring sudden pallor and anemia, weakness, fainting and great shock—quantities may be vomited and tarry stools later be present. It is often easy, but it may be difficult to diagnose. However, it is a factor that does not so often call for vigilant search or active interference.

As a complication, we would lay most stress upon malignant degeneration. Not because it calls for surgical relief oftener than does obstruction, malformation or perforation, but because *it is the fruitful soil for cancer implantation;* when cancer is once implanted the cure has been proven most difficult, partly, no doubt, because diagnosis is

slow. If we would conquer in this dreadful battle against cancer, we must enter the field of ulcer, and attempt to cure cancer in that stage when it is not cancer—but ulcer. Latency of both ulcer and cancer is to-day a great obstacle to their proper handling. Ulcer may be destructive, its first symptom sudden hemorrhage, perforation or obstruction—or malignancy may have been long implanted, and its first pronounced symptom be manifest only when tumor or dissemination has disclosed a hopeless condition. In our histories we find about one-half of the cancer cases with a long preceding ulcer history, and about 71 per cent. of excised portions when examined microscopically show implantation on an old ulcer scar. Therefore, when definite and obstinate gastric symptoms obtain we should not be slow to advise such treatment that not only offers general relief, but greatly mitigates the grave danger of cancer.

In differential diagnosis we shall touch but three of the many conditions that call for attention: cancer, chronic appendicitis and gallstones. In our round of differential diagnosis we would not forget pancreatic stone, kidney lesions, angina pectoris, gastric crises, intestinal colics, etc., as well as many general systemic diseases like pernicious anemia and Bright's, that may carry symptoms closely related to ulcer.

Cancer: In eliciting histories from those suffering from gastric cancer, we have found them to fall into three classes: first, those in which the disease seemed to appear suddenly in the enjoyment of perfect health; second, those in whom an attack or attacks in earlier years are definitely stated, and who, for years, have been well until sudden grave symptoms (as in Class I) threaten, and, third, those who for years have had typical attacks of chronic gastric ulcer. In the first and second classes we may find tumor, an advanced pathology and symptoms of chronicity suddenly and very acutely developed. We may find those cases whose only complaint is a diffident weak feeling, and who are chiefly concerned because an epigastric tumor has been discovered. Others complain of languor, weakness, loss of appetite and emaciation, and nothing on physical examination is revealed; the test meal may be of value here. We feel sure that, however great the difficulties here met in reaching a diagnosis, they are not less than in Class 3, where ulcer has been apparent for years.

Some patients are weak, emaciated and cachectic when ulcer is the only lesion. A palpable tumor and vomiting of delayed food, poorly macerated with coffee-ground appearance may be present and ulcer still the lesion—but tumors of the stomach are usually cancer. When cancer has once fastened itself upon the stomach the course is short and steadily downward, and remissions are seldom experienced. In cancer, so-called pyrosis may increase in time and amount, but loses its acidity; regurgitation day or night is also increased in amount and likewise loses its acidity. Vomiting is often more delayed, more copious, oftener blood-mixed and gives a strange and great relief, though rarely so complete as in ulcer. Vomiting and nausea are more often excited by liquid food; gas and bloating become more chronic and distressing; appetite is lessened and finally lost or a disgust for food is felt. Emaciation comes

on rapidly, pallor, anemia and weakness hasten; loss of power is marked, desire for activity is wanting and a great languor is felt. Food, instead of giving relief, is quite apt to produce immediate pain, which may be acute, but oftener is dull, sickening, almost indescribable, or a strange distress not related to food is common and continuous. With all this there is a mental depression, as though a consciousness of approaching evil. This mental attitude is the great factor that gives to the face the expression that so often marks the malignant sufferer. No symptom or symptoms seem sufficient by which to diagnose cancer of the stomach—the facies, the general appearance, the mental attitude, the physical condition, the direct gastric symptom all form a composite picture, a glance at which may make the diagnosis.

Chronic recurrent appendicitis is the type that simulates chronic ulcer of the stomach. There are distinct prolonged attacks. Pain is not referred to McBurney's point, and often no appendiceal tenderness can be elicited. There is no fever, no tumor, no symptoms that accompany the usual attack of appendicitis except those directly referred to the stomach. There can be little doubt that many of the chronic gastric symptoms are reflex, due to pyloric spasm. The pain may be purely reflex or it may be directly due to the pyloric spasm and the accompanying stomach reaction. Pain, vomiting, gas, increased secretion and sour eructations all follow pyloric spasm, whatever its origin, and the stomach reactions, whether due to pyloric spasm or obstruction, must give the same symptoms. So we have in spasm due to appendicitis, reverse peristalsis and the usual chronic stomach accompaniments of ulcer. As in complicated chronic ulcer, food soon increases the trouble and rarely gives direct and decided relief, while sour foods quite often offend. Quite a degree of invalidism may result. The symptoms, though scarcely as persistent and severe as in chronic complicated ulcer, give quite the same picture. If the early, clear history of peptic ulcer is lacking and we can get no history of typical appendicitis, and if all local appendiceal symptoms are absent, we are exceedingly disposed to diagnose gastric ulcer.

Gallstones: The great majority of biliary attacks are easily diagnosed. The symptoms appear in decided attacks of short duration (except chronic), usually moments or hours. Intermissions of days, months or years of perfect health are the rule in uncomplicated cases. The attack comes suddenly, often without the slightest warning. As characteristic as is this suddenness of onset is the abrupt cessation of the attack, perhaps during the height of pain, followed by immediate return to quite normal health. Pain is the great overshadowing symptom. It is epigastric with radiation to the right costal border, and to the right scapular region, or the chest and abdomen may be one great area of pain. It is lancinating, boring, severe, terrific—spasm of the diaphragm (dyspnea) is present and marked. The pain appears without any regularity as to time—day or night, to-day, next year, before meals, after meals, no meals. It is wholly independent of and not caused by food, neither relieved by it, and the patient rarely places a relation between food and pain. Gas is present and by pressure intensifies pain, for belching brings a degree of relief, but the bloated, distended, almost

bursting sensation that so many experience is due chiefly to the character of the pain and its field of radiation, rather than to the presence and pressure of gas itself. Vomiting, often present, may bring relief, but not with the certainty that it does in ulcer. It comes during the height of the attack, may be somewhat prolonged, consists of a green, bitter fluid, not copious, unless soon following a meal. Jaundice is more frequent (25 per cent.) in gallstones, and hemorrhage (25 per cent.) in ulcer; constipation is common in ulcer, while in gall-bladder disease the bowels are rarely disturbed. Nutrition fails during an active ulcer period—while in gallstones nutrition rarely suffers until duct complications and pancreatitis supervene.

We may find almost insuperable barriers when we attempt to differentiate between some chronic gall-bladder conditions and gastric ulcer with chronic perforations. Especially is this difficulty increased if, in ulcer, the perforation is posterior, when the pain radiates into the back. In both we may have chronic symptoms present, pain, vomiting, burning, distress, sour eructations, poor appetite and emaciation. These symptoms are usually recognized as those of gallstones, because of pain radiation, which is the only characteristic in the whole syndrome. There is another class of ulcer cases quite impossible to place correctly; it is usually the duodenal or pyloric type. The only symptom complained of is sudden, severe, short epigastric attacks of pain, more often without radiation, occasionally to the back. Recovery from pain which is due to chronic perforation or spasm comes rapidly and is complete. The attack is typical only of gallstones. No other rational preoperative diagnosis is possible. In the first group the early history promises solution. In the latter surgery must tell, or delay develop the characteristic symptoms. Until broader methods are evolved we must too often, in both gallstones and ulcer, rest satisfied with a surgical diagnosis.

THE SURGICAL TREATMENT OF NON-PERFORATIVE GASTRIC ULCERS.

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The surgical treatment of non-perforative gastric ulcer is indicated only when normal conditions can not be re-established by carefully planned and patiently and persistently executed dietetic, hygienic and medicinal treatment. This is most important because the portion of the digestive tract involved in the surgical treatment is structurally very admirable from a mechanical point of view when in a normal condition and splendidly suited for performing its physiological duties and because the mechanical perfection can never be attained with the most perfect surgical operation. It is consequently clear that every effort

must be made to restore the stomach to a normal condition with non-operative treatment if this is possible. The stomach and the duodenum must always be considered together in the discussion of this part of the question, because they go together embryologically, physiologically, pathologically, technically from the surgeon's point of view. Considered as a digestive machine, we have a storage reservoir in the cardiac end of the stomach with provisions for the secretion of the digestive fluids and a mixing apparatus for combining these liquids with the food.

In the pyloric end of the stomach we have the powerful muscles for grinding the food and forcing the larger portions back into the storage tank in the cardiac end of the stomach while the finer portions are passed on into the duodenum past the pylorus, where they will again be manipulated by a second mixing apparatus. Here the bile and pancreatic juice are added, and after this stage of mixing is past the food is ready to be turned over to the absorbing apparatus in the small intestines.

When this splendid apparatus has been hopelessly impaired by the obstruction due to an ulcer itself with an indurated base or a cicatricial stricture following the healing, or to a spasmodic closure of the pylorus caused by the irritation of an ulcer, it is plain that something must be done to restore this organ at least in a measure to its normal activity even though the mechanical conditions obtainable may not equal those present originally. It is a fact that even an impaired stomach may serve its possessor long and well if certain dietetic and hygienic precautions be constantly carried out, and there can be no doubt but what many cases that are now relieved only by surgical treatment could have avoided the necessity of this treatment had they lived as wisely after the first healing of their gastric ulcer as they are compelled to live after their surgical operation.

Non-perforative gastric ulcers require surgical treatment when they cause obstructions directly or secondary to the passage of food from the stomach to the duodenum, when there is acute or persistent hemorrhage, when there is excessive pain which can not be controlled without surgical interference and when there is a suspicion of the presence of an implantation of carcinoma. In case of acute hemorrhage it is best to keep the patient perfectly quiet and so use exclusive rectal alimentation and later to build up the general condition of the patient, but to operate before there is a recurrence of the hemorrhage, not even water should be given by mouth. The hemorrhage can most easily be started by placing some substance in the stomach which will disturb the clot closing the bleeding vessel. It is only rarely necessary to operate during a hemorrhage from non-perforating ulcer. In preparing patients for operation it seems wise to cleanse the teeth and tongue frequently and thoroughly for several days before the operation and to give only sterile food.

The proposed operation must produce the best possible anatomic physiologic machine. It must prevent the further accumulation of irritating gastric fluid and must provide rest for the pyloric sphincter. There are but three operations which seem to be valuable at the present time: (1) pyloroplasty, (2) excision of the ulcer, (3) gastroenterostomy.

1. *Pyloroplasty.*—Practically my results have not been permanently satisfactory with pyloroplasty, although Finney and a few others reported good results in selected cases. My personal impression has been that the tissues in the obstructed pylorus do not make a satisfactory field for a plastic operation.

2. *Excision.*—Except when carcinoma has been suspected or when an ulcer has given rise to an hour-glass stomach, I have not deemed it necessary to excise gastric ulcer, because this increases the danger without improving the results. Rodman's plan of excising the ulcer-bearing area is brilliant theoretically, but has not received general adoption.

3. *Gastroenterostomy.*—Ulcers heal after gastroenterostomy has been properly performed. Whether the healing is due to drainage of the rest of the diseased portion, to the reduction in secretion and accumulation of irritating gastric juice, or, as Mr. Cameron thinks, to the alkalinization of the stomach contents due to the introduction of bile and pancreatic fluids through the anastomosis opening has not been definitely proven, but the fact remains that the ulcer actually heals if the operation has been performed properly.

As regards the technic of the operation it seems best to insist that every surgeon should learn the details at the operating table by observing the successful surgeon as he carries out each important detail. One can not learn this from books or from description. The following points are important:

1. The abdominal incision should be ample.
2. The gastroenterostomy opening should be large.
3. It should be remote from the ulcer.
4. It should, however, be at the lowest point of the stomach.
5. It should be on the posterior surface of the stomach when possible.
6. There should be no tension.
7. There should be no distortion.
8. There should be sufficient opening in the transverse mesocolon.
9. The edge of this opening should be sutured carefully to the stomach or the jejunum after the anastomosis has been completed.
10. The simplest technic possible should be employed.
11. All unnecessary trauma should be avoided.
12. All unnecessary exposure of the intestines should be avoided.
13. The smallest possible amount of anesthetic should be employed.
14. The operation should never be performed unless either an ulcer or pyloric obstruction can be demonstrated.

After-Treatment.—The patient should be placed in a sitting position as soon as possible after operation. In case of gastric dilatation the stomach tube should be introduced. Gastric lavage may be used, but not more than one-half pint of fluid should be used at a time. Proctoclysis by Murphy's drop-method and rectal feeding should be employed.

SURGICAL TREATMENT OF PERFORATING GASTRIC AND DUODENAL ULCER, WITH REPORT OF A CASE OF PERFORATING GASTRIC ULCER—RECOVERY.*

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The repair of perforation of the stomach and duodenum resulting from ulcer is indeed a strictly modern procedure. Suture in a gastric perforation was first done by Mikulicz in 1880. The first successful case was reported by Kriege in 1892. In 1888 Sidney Jones did the first operation for perforation of the duodenum, a diagnosis of peritonitis being made—the perforation being discovered at the autopsy. In 1894 Dean had a successful case, but the patient died two months later from intestinal obstruction. Landerer and Glucksmann's case (1896) lived six months and died from a second perforation. In the same year Dunn operated a case that made a permanent recovery. In America Finney and Weir were the first successful operators.

M. Martens of Berlin says[1]: "The early fatal ending of perforating gastric ulcer is the reason why in former years cases seldom came under observation or treatment." From 1895 to 1897 he did not have a single case; 1898 to 1903, 2 cases; since 1903, 11 cases of perforating gastric ulcer and two perforated duodenal ulcers; eight of the gastric ulcers were in 1907. The thousands of graves made from perforating gastric and duodenal ulcers, like those from appendicitis and perforation of the intestines in typhoid, mark the victims of an undeveloped age in this particular branch of the science and art of surgery.

Perforating ulcer of the stomach and duodenum may be classified as acute, subacute and chronic. In acute perforation the opening in the stomach communicates directly with the free peritoneal cavity, the stomach contents escaping unimpeded into the peritoneum. Acute perforations are usually on the anterior wall of the stomach. Subacute perforation is preceded by more or less local peritonitis in the locality of the ulcer, so that a protective wall is formed by adhesions to surrounding tissues or by plastic exudates preventing the perforation occurring into the free peritoneal cavity. In subacute perforation the escaping visceral contents are more or less circumscribed. In subacute cases perigastritis and a local peritonitis with their accompanying symptoms precede the symptoms of actual perforation. In chronic perforation the base of the ulcer becomes adherent to some adjacent organ as the pancreas, liver or adhesions formed by plastic exudate, so that no premonatory symptoms precede the actual perforation of the visceral wall and the symptoms induced after perforation are those of sepsis from absorption from a subhepatic, retrocolic, perigastric, or subphrenic abscess. A large majority of subphrenic abscesses are induced by chronic per-

* Read at the fifty-ninth annual session of the Illinois State Medical Society, May 18, 19 and 20, 1909.

1. Martens, M.: Zur Technik der Operation des perforierten Magengeschwurs, Deutsch. med. Wchnschr., 1907, xxxiii, 1857.

forating gastric or duodenal ulcers. Chronic perforations are usually on the posterior wall of the viscus. A subphrenic abscess may penetrate the thoracic cavity, pericardium, gall bladder, intestine, or anterior abdominal wall.

Frequency of Perforation.—According to various authors, the frequency of perforation in gastric ulcer is estimated from 28.5 per cent. (Fenwick) to 6.6 per cent. (Welch[2]). Perforation is much more frequent in duodenal than in gastric ulcer. Deaver says[3] that about 15 per cent. of patients with gastric ulcer die from perforation, whereas in duodenal ulcer one-fourth will develop this complication. In 272 operations for duodenal ulcer Mayo (cited by Deaver) reports 66 for perforation, making over 24 per cent.

Age and Sex.—Perforation may rarely occur in childhood or in extreme old age, but is most common in middle age. Gastric perforation is quite common in women under 25. According to W. J. Mayo, chronic ulcer occurs in the stomach with equal frequency in the two sexes, but in the duodenum more than three-fourths are in males.[4]

Site of Perforation.—Although ulcer is most frequently found on the posterior wall, perforation occurs most frequently on the anterior wall. This is due to the fact that the posterior stomach wall is in contact with adjacent structures or viscera, as the spinal column, pancreas, Spigelian lobe of the liver and duodenum, so that adhesions take place between these tissues and the base of the ulcer, protecting the general peritoneal cavity against perforation. In acute duodenal perforation the location is most frequent in the first portion of the intestine and on the anterior surface. In 20 per cent. of reported cases the perforations were multiple and in a large per cent. of perforating ulcers there were other ulcers in the stomach, though not perforating.

Size of Perforation.—The size of the perforation may vary from that of a pin point to one several inches in diameter.

Symptoms.—The first and most characteristic symptom of acute perforation is pain of an intense burning, agonizing character. If a patient is seen in this condition the picture is one that can not be forgotten. There is usually a sudden outcry and the face becomes pinched and pallid and expressive of the most intense suffering. In the case which I report later the patient was awakened suddenly in the night and threw himself from the bed and was found writhing in agony upon the floor. The picture is that of shock and collapse. The extremities become cold and the face covered with cold perspiration. The respiration is costal and rapid, the pulse feeble and markedly increased in rate. Vomiting usually occurs, but is not persistent, as in intestinal obstruction. The pain is located in the upper abdomen (epigastric, right or left hypochrondriac region). Rigidity of the upper abdominal muscles and tenderness upon pressure are important symptoms. If the extravasated material is extremely virulent and rapidly absorbed, the endotoxins

2. Robson, Mayo: Keene's Surgery, III, 860.
3. Deaver, John B., and Ashhurst, Astley Paston Cooper: Surgery of the Upper Abdomen, I, 203.
4. Mayo, W. J.: Chronic Ulcer of the Stomach and Duodenum, St. Paul Med. Jour., June, 1908.

set free by destruction of bacteria in the blood is so abundant that the patient is overwhelmed and dies in a few hours without developing rigidity of the abdominal muscles. If, however, the dose of endotoxins is not fatal, there is a peritoneal reaction within one or two hours and muscular rigidity and tenderness become pronounced.

Thirst is usually marked, but should not be gratified, as the fluid escapes through the perforation, spreading infection in the peritoneal cavity. If there is a rapid escape of gas in the abdominal cavity, liver dulness may disappear. An examination for the absence of liver dulness, if made in the axillary line, is less misleading, according to Manges, as thereby the distended intestinal element is eliminated. Tympany is a late symptom indicative of intestinal paralysis due to spreading peritonitis or to profound toxemia of the central nervous system. Immediately after the perforation some authorities claim that a fall of temperature occurs; within an hour or two, however, there is a rise of temperature and an increase of the pulse rate. A marked peritonitis, though, may be present without a corresponding rise of temperature.

Chilliness and a high temperature is indicative rather of cellular or lymphatic infection. Such a temperature is more common in chronic perforation with general sepsis. In this, as in all cases of peritoneal sepsis, the pulse rate is a more reliable sign than the temperature.

In subacute perforation there may be pain, muscular rigidity and the other symptoms characteristic of acute perforation, but these symptoms are in every way less pronounced in character.

The symptoms of chronic perforations are those peculiar to perigastric and subphrenic abscesses. There is usually a history of long continual stomach trouble due to ulcer. There may be sharp pain in the upper abdomen, with tenderness and rigidity, but usually the perforation is so gradual that the peritoneal cavity becomes protected by extensive adhesions and it is impossible to estimate the time when perforation actually took place. Sooner or later an abscess forms, sometimes manifested by a bulging tumor in the epigastric or hypochondriac regions. Accompanying this there are symptoms of general sepsis, chills, elevation of temperature, increase of pulse rate and rapid loss of flesh. An abscess may penetrate the chest cavity, simulating empyema, causing sudden death or the lung and the contents of the abscess be expectorated. According to Basnard, cited by Deaver, thoracic signs and symptoms were present in 56 of the 76 cases of subphrenic abscesses studied by that author. There may be dulness on percussion with upward displacement of the lung and increased vocal resonance. The apex of the heart may be displaced upward.

Mayo Robson speaks of the coin test used in a case as follows: "On placing the stethoscope over the eighth intercostal space, which region was dull on percussion, and on placing a coin over the stomach and percussing it with another coin, the sound was distinctly conveyed through the whole of the abscess cavity and through the stethoscope to

the ear. The diagnosis was confirmed by operation.[5] Gas may be present in the upper portion of the abscess, giving a tympanitic sound between the duller sounds elicited by percussing the lung above and the lower portion of the abscess below. An abscess may ulcerate into the stomach and be vomited or into the retroperitoneal tissue and burrow downward to the groin or iliac region. Mayo Robson cites two cases of perigastric abscess, one of which was opened in the left groin and the other in the left iliac region. The *x*-ray should be employed for diagnosing abscess where it is possible to do so. The aspirator needle should never be used except when the surgeon is ready to immediately proceed with the operation of draining the abscess.

Differential Diagnosis.—Duodenal perforation is most difficult to differentiate from gastric perforation. The question of sex is of some importance, as duodenal perforation occurs much more frequently in males. The previous history of the case may be of some aid, yet it is not always possible to make a correct diagnosis between these two conditions, nor is it of any special importance to do so, as both require immediate operation and the surgical treatment is practically the same. Other diseases for which perforation may be mistaken are acute appendicitis, ruptured tubal pregnancy, acute intestinal obstruction, acute hemorrhagic pancreatitis, phlegmonous cholecystitis or rupture of the gall bladder, and mesenteric thrombosis. These conditions also require immediate operation, so that no harm is done if the diagnosis must be made by exploratory laparotomy.

It is different, however, with another class of maladies for whose relief surgery is unjustifiable—namely, pneumonia with sudden pleuritic pain, irritant poisoning, ptomaine poisoning, acute dilatation of the stomach or gastro-intestinal crisis from some forms of skin disease. While the greater number of subphrenic abscesses are caused by chronic perforating gastric or duodenal ulcers, yet not a few have their origin from appendicitis. Elsberg was able to collect 73 such cases, to which number Eisendrath[6] added 33 cases, including 5 of his own. In all of Eisendrath's cases there was a previous history of appendicitis treated or operated from one day to one year before symptoms of abscess appeared. Mayo Robson says that in nearly all cases a correct diagnosis may be made from the history of the cases and that in 90 per cent. a previous history of gastric irritation can be obtained.

TREATMENT.

Surgery offers the only remedy in the handling of this distressing complication. The death rate with non-interference, according to Robson, is 95 per cent., according to Deaver 99 per cent. The treatment naturally falls into two divisions:

1. Acute cases, the treatment of which is abdominal section at the very earliest moment after perforation, repair of the perforated viscus, surgical procedure to overcome or anticipate obstruction or for healing ulcers (gastrojejunostomy), and the application of those principles to

5 Robson, Mayo: Keene's Surgery, iii, 868.
6. Eisendrath, Daniel N.: Jour. Am. Med. Assn., March 7, 1908.

conditions of the peritoneum best calculated to prevent or limit septic peritonitis.

2. Subacute and chronic perforations, in the management of which we have to deal, not with the perforation itself, but with conditions resulting from perforation—viz., the various forms of abscess and their ramifications, as subhepatic, retrocolic, perigastric and subphrenic, and the general sepsis resulting therefrom. The principle involved in the treatment is the location of the abscess and providing a safe conduit through which its contents may reach the surface of the body.

In the acute perforation the upper abdomen should be entered through an incision in the median line or through the upper portion of the right rectus muscle. The latter incision renders perforations near the pylorus and duodenum most accessible. When the abdomen is opened gas usually escapes and more or less of the stomach or duodenal contents will be encountered. If the stomach is full at the time of perforation or liquids are given the abdominal cavity may be found flooded. In a very interesting and successful case of gastric perforation operated upon by Dr. Arthur C. Roper of London[7] a pint of curded milk was found about the stomach and the pelvis filled with milky fluid. In the writer's case perforation occurred when the stomach was empty and only a small amount of gastric juice and mucus was found about the pylorus.

The intestines should be protected by gauze sponges during the time of suturing. Usually it is not difficult to locate the perforation, for in acute cases it is found on the anterior surface—in stomach cases most frequently in the pyloric region or upon the lesser curvature. The perforation should be closed with linen, a purse string, interrupted Lembert, or Lembert-mattress suture being used. Frequently the base of the ulcer is hardened and friable from induration and will permit but little tension upon the suture. In such cases the perforation may be more securely sealed by grafting over the sutures a piece of the greater or gastro-hepatic omentum. After an ulcer perforates there is a tendency to heal spontaneously, so if leakage can be controlled for a short time healing readily occurs. In case the location of the perforation is inaccessible or its edges so friable that suture is impossible, good results have been obtained by tampon or by draining the stomach through a temporary gastrostomy.

Lennander thus drained the stomach of a patient with perforation and stenosis upon whom he operated 60 hours after perforation. About three and one-half months later gastrojejunostomy was done for pyloric obstruction. Lennander[8] recommends temporary gastrostomy in cases where stenosis is liable to follow operation for perforation and where the patient's condition will not allow the more prolonged operation of gastrojejunostomy. Gastrojejunostomy is recommended as a secondary operation when symptoms of stenosis appear. He says temporary gastrostomy is indicated: 1. If the gastric wound can not be absolutely

7. Roper, Arthur C.: Brit. Med. Jour., Sept. 19, 1908.
8. Lennander, K. G.: Temporary Gastrostomie bei Magen-oder Duodenal-gesch, besonders bei perfornerten Geschowinen ut gleichzei tiger Rentention. Deutsch. Ztschr. f. Chir, 1908, xcii, 297.

securely closed on account of the location or quality of the ulcer. 2. If there are symptoms of paralysis of the small intestines.[8] Paring the edges of the ulcer is unnecessary and excising the ulcer before suturing increases the mortality and renders pyloric stenosis more probable. Von Kautz of Wien excised the ulcer in three cases, the patients all dying. The operation was not repeated.

Where the perforating ulcer is near the pylorus stenosis is liable to occur and the question of doing a gastrojejunostomy at the same time the perforation is repaired must be considered. The advisability of such a procedure will depend much upon the time elapsing between the perforation and the operation for its repair. If the operation can be done early—two or three hours after perforation—and the patient's condition is good, a gastrojejunostomy should be done. This is recommended by Deaver, Mayo Robson, Lennander, Körte, Martens and others. The Mayos, who have operated upon 30 cases, perforating into the free abdominal cavity, have done gastrojejunostomy at the same sitting five times. As a secondary operation two of their cases have demanded this procedure.[9]

With my case laparotomy and repair of the perforation were done three hours after the accident. The perforation was so near the pylorus and its base so indurated I was certain that pyloric stenosis would follow. The patient was in good condition, yet the fear of prolonging the operation and spreading infection deterred me from doing a gastrojejunostomy. Three weeks later I was obliged to do this operation for pyloric obstruction, the patient making a good recovery. I now believe under similar conditions the two operations in one sitting is the operation of choice. If there is a question of doubt, however, the patient should be given the benefit and gastrojejunostomy done as a secondary operation. The posterior no-loop operation as now performed is as satisfactory as any operation in surgery.

The proper toilet of the peritoneum where septic material is present is still a question of some discussion among surgeons. Where undigested food has entered the peritoneal cavity through a perforation it should be removed, but the belief is growing stronger that irrigation and mopping away of pus and exudates in septic peritonitis is not only a waste of time but a dangerous procedure calculated to spread septic material toward the diaphragm and open new fields for infection. The experiments of Buxton[10] on the processes of absorption from the peritoneal cavity demonstrate that practically there is no absorption by any other part of the peritoneum besides the diaphragm and the omentum. Many bacteria are entangled by exudates on the surface of the omentum and destroyed by phagocytes, while some are absorbed by the omental lymphatics. Within five minutes after bacteria are introduced into the peritoneal cavity they will be found in great numbers in the blood and in lesser numbers in the liver and spleen and in the anterior mediastinal lymph nodes which they reach from the diaphragm. It is evident, therefore, that anything which spreads bacteria toward the dia-

9. Personal communication.
10. Buxton, B. H.: Jour. Med. Research, 1906, xv, 3-18, and 1907, xvi, 17-24.

phragm, as mopping and irrigation, increases the danger for the patient. From this we get our rational treatment for reducing manipulations in the peritoneal cavity to a minimum and for maintaining the patient in the Fowler position.

AFTER-TREATMENT.

The two cardinal points in the after-treatment are: 1. The diverting of septic material from the location of the diaphragm—most satisfactorily accomplished by supporting the patient in the Fowler position. 2. The dilution and elimination of toxins by proctoclysis as advocated by Murphy. The introduction of the semi-upright position in the treatment of septic conditions in the peritoneal cavity was a revolution in method as well as a revolution in results. Proctoclysis is a treatment of nearly equal importance, but in ordinary hands we believe the method of applying it is carried out with very indifferent results. It seems very difficult for the average nurse or interne to grasp the principles involved in its use, and if the principles are comprehended it is often very difficult to obtain a proper watchfulness and faithfulness in its application. The solution is often found to be too cold. If the fountain syringe or can is placed too high the rectum rebels and the solution is expelled into the bed; if too low, the patient does not receive it at all. The principle of the treatment is absolutely correct, but its application, I believe, is not yet perfected.

Drs. Murphy, Newman and Wechsler have recently contributed articles upon the application of the treatment.[11] The apparatus of Newman is ingeniously arranged to maintain a uniform temperature, but, as Murphy says, it will not allow the fluid and gas to be forced back into the receptacle when the patient strains. If this can not occur the fluid will be forced out of the rectum into the bed. Where the fountain can has been properly adjusted, and the flow regulated wholly by gravity, I have seen fluid with small particles of fecal matter forced back into the receptacle and again return to the rectum. Could this not have been accomplished by the patient it would have been expelled into the bed. The simplest method we have for using proctoclysis is the fountain can with a bottle of hot water placed into the solution in the can to maintain a proper degree of heat.

In Lennander's case, already cited, besides doing a temporary gastrostomy, a drainage tube was also placed through an incision into the cecum, remaining there for five weeks. This operation (typhlostomy), Lennander says, helps to prevent paresis of the intestines and provides an efficient means for supplying nutrition. This procedure of Lennander's, together with the previous suggestion of Weir that the appendix (appendicostomy) could be used in like manner for irrigating the colon in cases of amebic dysentery, and mucous colitis, suggested to my mind the feasibility of employing the same method for enteroclysis. I have never tested it, but it seems to me in selected cases it would

11. Murphy, J. B.: Proctoclysis in the Treatment of Peritonitis. Newman, Samuel E.: Continuous Enteroclysis. Wechsler, B. B.: An Apparatus to keep Enteroclysis Solution Hot, Jour. Am. Med. Assn., April 17, 1909.

be ideal. In septic peritonitis, where the primary focus of infection is in the lower abdomen, the application of this method is comparatively simple. A catheter or small drainage tube might be secured by a purse string suture in the appendix or cecum, as in gall bladder work, and anchored into an incision in the right iliac region.

In many cases of general suppurative peritonitis with the primary focus of infection in the upper abdomen the lower abdomen is invaded, requiring low incision. Here again the method is applicable. If the appendix or cecum is stitched to the peritoneum or apponeurosis the danger of permanent fistula would be small, and, as this portion of the intestine has but a very limited motion, the danger of leakage or complication from being fixed need hardly be considered. By this method normal salt solution could be administered very rapidly and at a greater degree of heat immediately after operation, a matter of great importance in desperate cases.

Again, liquid nourishment could be administered at will, thus avoiding the annoying and doubtful method of rectal feeding.

TREATMENT OF SUBPHRENIC AND PERIGASTRIC ABSCESS.

Barnard, according to Deaver, divides the area beneath the diaphragm into four peritoneal and two cellular spaces. The falciform ligament divides the peritoneal spaces into a right and left space. These are again divided into anterior and posterior spaces by the lateral ligaments. The two cellular or extra-peritoneal spaces are (1) "that included between the layers of the coronary ligament; (2) that extending from the cellular tissue around the upper pole of the left kidney up to beneath the left dome of the diaphragm." The treatment of these abscesses is to furnish thorough drainage by the most accessible route. The operations are classed as anterior, posterior and lateral. The posterior include the transpleural and subpleural operations through the diaphragm.

For anterior perigastric abscess the incision should be median or in left hypochondriac region. Counter drainage through left loin should be provided if the abscess extends well downward. Posterior perigastric abscess (abscess of the lesser peritoneal cavity) may be drained through the front or through an incision in the left loin below the last rib. It is better to enter the peritoneal cavity and locate the abscess than to attempt to make the incision directly into the abscess cavity. In cases where the abscess is low posteriorly the exploratory incision in front may be closed and the abscess drained through the left iliocostal space, or it may be drained both in front and behind. An abscess occupying the subhepatic space and right renal pouch should be drained anteriorly and by counter drainage in the right loin.

If the abscess does not extend beyond the costal border it may be approached by resecting a portion of the tenth rib between the anterior and posterior axillary lines, the pleural reflection pushed upward and the abscess opened by incising the diaphragm without opening the thoracic cavity, as recommended by Eisendrath. If the thoracic cavity must be entered to drain a subphrenic abscess a portion of one or two

ribs should be resected and, if possible, the costal and diaphragmatic pleura should be stitched together before the abscess is opened, thus avoiding infection of the thoracic cavity. If diffuse peritonitis complicates subphrenic abscess the thoracic route should not be employed until a laparotomy is done and the intra-peritoneal conditions dealt with.

In all cases where the abscesses are approached by the abdominal route the intestines and surrounding tissues should be protected by careful packing with gauze sponges and the Fowler position and proctoclysis should be employed in the after treatment.

PROGNOSIS.

Subphrenic abscess is always a very serious complication. The mortality rate reported by most operators varies from about 15 per cent. to 52 per cent. In a personal communication Dr. W. J. Mayo states that they had operated on about 20 cases with good results. The exact results could not be given on the whole number of cases. The last they had looked up were twelve cases with no deaths. The death rate without operation is at least 82 per cent. Barnard claims the best results by the posterior method of drainage. A mortality rate of 13.3 per cent. by the posterior method against 22.2 per cent. by the anterior method. Mayo says they have usually found the abscess most accessible from the front.

In acute perforations the mortality rate is from 30 per cent. to 66 per cent. Gross and Gross, who have collected from various sources reports of 369 operations, give a mortality of 50.67. per cent.; Mayo 30 cases, with 7 deaths, 29.9 per cent. Moynihan reports 24 perforating cases (16 of stomach and 8 of duodenum) operated upon, with a mortality of 37.5 per cent. When these conditions are more readily diagnosed by the physician and the patients brought to the surgeon in time for an early operation statistics will undoubtedly be much improved. "The best example of the excellent results of early operation with which I am acquainted," says Mayo Robson, "were reported by Sinclair Kirk—11 cases with 11 recoveries. Eight were done within five hours after perforation, one seven, one ten, and one twenty hours after operation.[12]"

REPORT OF CASE.

H. W. G., male, aged 52 years. In November, 1907, began to have distress in stomach with slight pain after taking food. In December had dizzy spells and very sour eructations. December 26, had a severe attack of dizziness, vomiting and fainting. Was confined to bed two days. Distress in stomach, sour eructations and occasional vomiting continued. By July 1, 1908, food could be retained only one hour. August 24, I saw the patient and ordered a test meal and stomach analysis; this showed hyperacidity, a few blood corpuscles and the usual condition characteristic of gastric ulcer. Gastric ulcer diagnosed and operation advised. At midnight August 26, the patient vomited a half pint of fluid having the appearance of coffee grounds in which were some streaks of blood. At 3 o'clock the same night he was awakened and cried out with an intense pain in the stomach and a few moments later was found upon the floor by members of the household suffering agonizing pain.

A diagnosis of gastric perforation was made, the patient removed to the hospital and a laparotomy done three hours from time perforation occurred. A per-

12. Sinclair, Kirk: Med. Press, March 29, 1905.

foration was found in the anterior stomach wall about two inches from the pylorus through which I could pass my index finger. The perforation was closed (first) by interrupted Lembert sutures; (second) purse-string suture; (third) a graft from the gastro-hepatic omentum.

The base of the ulcer was greatly indurated and very friable, so that but little tension could be made upon the sutures. The case progressed without symptoms for three weeks, when vomiting began, and for two days everything put into the stomach was rejected. It was evident that the ulcer in healing had produced an obstruction of the pylorus. A posterior no-loop gastrojejunostomy was done. The patient made a good recovery. I saw this patient a few days ago, and now, after nine months, he is well, in good flesh, and is suffering in no way from stomach trouble.

CONCLUSIONS.

1. Ulcers of the stomach and duodenum are much more common than is usually supposed.

2. The life of an individual with ulcer is perpetually jeopardized by the possibility of perforation.

3. The treatment of perforating gastric or duodenal ulcer is limited to surgical procedure.

4. The prevention of perforation means the early diagnosis of ulcer in the preperforative stage and its treatment by excision or gastrojejunostomy.

I wish to acknowledge my indebtedness to contributions by Drs. W. J. Mayo and Mayo Robson and the comprehensive work on "Surgical Diseases of the Upper Abdomen," by Drs. Deaver and Ashhurst.

SYMPOSIUM ON GASTRIC AND DUODENAL ULCER.

DISCUSSION ON THE PAPERS OF DRS. GRAHAM, SIPPY, OCHSNER AND ALLABEN.

Dr. John B. Deaver, of Philadelphia, was asked to open the discussion. He said: While my pleasure has been great in coming to this meeting, it has been made much greater by having heard these magnificent and logical papers on the surgery of the stomach this morning, and I am sure that my pleasure will be still greater when I hear the discussions of Dr. Billings and Dr. Bevan.

There is no class of affections that I approach with a greater degree of feeling of responsibility than stomach cases. I have felt for some time that too much has been done upon the stomach, and I have up to the present no reason to think otherwise. I include myself among the number who have done too much. The more surgery of the stomach I do, the more I realize and appreciate the responsibility that we surgeons must have the courage to close the abdomen if we do not find a positive lesion. In the past I have not done so. In the future I hope to do better. (Applause.) The avoidance of operation in acute bleeding from the stomach, as mentioned by our medical friends this morning, is very important. Few patients die of acute hemorrhage of the stomach treated medicinally; many die that are treated surgically. That has been my experience. We must not confound hemorrhage from varicose veins of the esophagus and cirrhosis of the liver with gastric hemorrhage. I recall a patient upon whom a gastroenterostomy for such a condition was done by another surgeon, as a matter of course with no benefit. Within a year thereafter another hemorrhage occurred, and it was at this time the patient came under my notice. One week following this a patient was sent to me with a similar condition, by a consultant; I opened his belly, but closed it without doing anything. These patients that bring up a basinful of blood at one vomiting are not subjects of gastric ulcer as a rule.

There are only one or two additional points I wish to speak of. I was particularly interested in what Dr. Ochsner said about making large incisions, not

too large, but large enough. That is sound teaching. To try to pull the stomach, the transverse colon with it, through a small opening for the purpose of the esthetic effect is a great mistake. You will do a great deal of damage, and, as the Bible says, you will leave the last state worse than the first by the dissemination of the sepsis, in causing phlebitis, and exposing the patient to the dangers of pulmonary embolism. Surgery can not be done with ease through a small incision. I was struck with Dr. Ochsner's remarks with regard to the mechanics of the stomach, and the point he brought out of attaching the margins of the opening in the meso-colon to the stomach. In attaching the margins to the small intestines, we are more liable to have circular contraction than if attached to the stomach. A large gastroenterostomy opening is essential.

I was also struck by what Dr. Ochsner said in regard to acute gastric dilatation. I have been fortunate never to have seen a case of gastric dilatation. The reason I have not seen it I think is because I do not wait for the patient to vomit or hiccough, but as soon as there is a little distention I wash out the stomach.

The question of medical treatment is more important after gastric surgery than before it; I mean, of course, the class of cases that require gastric surgery. All these cases should be treated systematically and for a considerable length of time. It is my practice, after doing gastroenterostomy for obstruction of the pylorus, to hand the patient over to a medical man, and I am sure that this patient twelve months hence is better off than had he remained in my hands.

Dr. Frank Billings, of Chicago: I think it must be a pleasure to every medical man to have been here and to have heard this discussion by the surgeons. It is not very many years ago when surgeons were not as liberal in their expressions with regard to the treatment of chronic gastric and duodenal ulcers as they are to-day. I myself have expressed pretty strong convictions about a certain class of cases to be treated surgically. I think we owe a great deal to the man who has read the paper on the medical treatment, that is, Dr. Sippy. He deserves great credit for working out a systematic scheme which is just as technical as is the surgical treatment of ulcer. It does not consist of rest treatment, because we knew that before, but in the use of the stomach tube to drain the superabundant gastric juice which occurs in most cases of gastric ulcer. In following these cases out carefully and thoroughly, he has had his contemporaries with him in that respect, and coming out of it there is a more successful and hopeful view of these cases to be taken. If we medical men had in past years, and if all of us now would give the medical treatment with the same accuracy, technical skill, and continue our observations of cases long enough, there would not have been this controversy in the first place, and it will grow less and less in the future. That is absolutely true, for in the past the majority of us have been as remiss as it is possible for men to be in the medical treatment of gastric ulcer. There is no question about it.

Here is another point which I have been holding out for a good deal, and many medical men are taking the proper view of it: The surgeon has his operating rooms prepared in the proper way for the surgical treatment of his cases in a hospital or hospitals. He has a corps of assistants, a corps of nurses, and will not permit anyone to help unless he or she is skilled in certain work. The surgeon sees that he has his sterilizing apparatus properly fixed. It costs a great deal to do all that. We medical men in the past in our treatment of medical cases have not had the facilities and equipment we should have in our department of medicine in order to cope with these cases. These things are just as important to the patient as the operating room is to the surgeon. We should see to it in the future that such arrangements are made as are necessary, even though it may be attended with considerable expense, by which we can have a kitchen or dietary properly prepared. When doctors point out this need in our hospitals, expensive as it may be, with a dietician at its head, with properly skilled cooks in charge of the kitchen, we will have greater success than we have had, not only in the treatment of cases of gastric ulcer, but in many other conditions, and I am going to keep on until I get such a system installed in the hospital where I work.

I was very much gratified to hear Dr. Graham's paper on the symptomatology. Anyone who has studied many cases of chronic ulcer of the stomach realizes that he has written a classical paper on that subject. I have no word of criticism to offer, and I wish I could have written as good a paper as he has done on that subject. Anyone who will examine many of these patients will find that the history of the patient is one of the most important things which we must obtain in arriving at a diagnosis, and unless it is a good history it will be impossible to arrive at a proper diagnosis, and differentate the trouble from the other important diseases which occur in the right side of the abdomen.

With reference to the treatment, I agree with what Dr. Sippy has said upon that phase of the subject and of the differentiation between the real surgical case and the medical one. I am also gratified to hear what Dr. Ochsner and what Dr. Deaver have said upon it. We can not differ from them at all. The real crux of the situation in treatment is the question of motility, after all. The surgeon formerly told us that he made a gastroenterostomy for the purpose of drainage and to lessen the secretion in the stomach, and also to afford rest to the ulcer by permitting food to go through the new opening. Well, years of experience have shown that he did not succeed in all he attempted to do. Just so long as the pylorus is unobstructed by adhesions or inflammatory swelling, or by cicatricial contraction, etc., a gastroenterostomy does not afford an opening through which the food will go. It does not make any difference whether it is a long or short loop, the food will continue to go through that loop. That has been proved, and consequently a gastroenterostomy does not furnish the stomach with a motor power which is good, and often it is absolutely bad. We medical men see more of these cases, who have had gastroenterostomy performed on them, than the surgeons do return with symptoms. I have seen dozens of them, and Dr. Sippy and other medical men have seen many such cases. I wish Dr. Graham, when he closes the discussion, would tell us how many patients have returned to the Mayos for continued disturbances of the stomach where gastroenterostomy had been performed by them. I have been told by both the Mayo brothers that many of these patients have returned, and they have restored the gastro-intestinal canal to its former condition by undoing the loop for the conditions which continued, that is, poor motility of the stomach; so that surgeons and medical men are coming together upon this question of the mechanics of the stomach, and the last word has not been said yet. I have repeated that phrase many times. I said it in Boston two years ago when there was a symposium on this subject in the Medical Section of the American Medical Association, and I said it in Philadelphia before the College of Physicians and Surgeons, as well as in Chicago and many other places. We have not learned all there is to learn about this subject. Two years from now there may be more cases for the surgeon. A new method may be evolved in the mechanics of the stomach which will give this organ better motility than it now has. We have not followed our cases long enough to determine absolutely what has been accomplished by medical treatment. If they are kept under observation long enough and examined now and then, and are found to remain symptom-free, it is very likely the medical treatment of gastric ulcer will be found more successful than it has been considered in the past. However, until we have enough statistics on the subject, we can not be sure; but the consensus of opinion of those men who have done the most work, both surgically and medically, is along the lines that have been discussed this morning. From our present study of the subject, as indicated in such papers as those presented by Dr. Sippy and Dr. Ochsner, many of these cases are medical and should be treated intelligently and long enough in order to judge of the ultimate results. That is an important point in our medical treatment, as Dr. Sippy has pointed out, namely, put these patients to bed, keep them under control, give the stomach complete rest as nearly as possible, give the kind of food which will lessen secretion, which will give the stomach as little mechanical work to do as possible, keep these patients under observation long enough to know that the ulcer has healed by the symptomless condition of the patient and by the absence of occult blood in the stool.

Here is another point which always has its relation to certain individuals, namely, what are you going to do with the poor laboring man or the woman who must earn her living and who suffers in this way? We can not put such a patient as that to bed and keep him or her under control for the length of time necessary. They have a certain earning capacity which ought to be considered. Does that in any way alter or modify our advice to such patients? Formerly, we would have said yes, it does. Such a patient should be put on the feet as quickly as possible by having a gastroenterostomy done, and therefore restored to a useful life. We gave this advice before we knew what the results of gastroenterostomies would be. Now, we know that a gastroenterostomy may not restore the patient to a useful life. We know now that a careful rest treatment may be carried out in two or three weeks with great benefit, the patients being confined no longer than for an appendectomy or drainage of the gall bladder, certainly no longer than for a sickness with pneumonia, and less than for typhoid fever, if we can control them afterwards and keep them on a proper diet with simple medication. I mention this last subject because it has been brought to my attention by several physicians and patients themselves who were unable to spend the time for prolonged treatment. These patients can be restored to useful lives by adhering to a proper diet for ulcer, to lessen the mechanical irritation of the stomach, tc lessen the secretion of gastric juice, etc. I congratulate myself and all of us on the fact that this subject has come to its present status. It is beautiful.

Dr. Arthur Dean Bevan, of Chicago: Dr. Billings congratulated medical men on being present and hearing what the surgeons had to say to-day on this subject. I want to return the compliment and say that I think the surgeons are to be congratulated on being here to-day and having listened to what the medical men have to say, because we are getting together on a very common broad ground in the handling of these stomach cases. I think it is one of the best examples of borderline work we have, where it is absolutely essential, in order to work out the best results, to have the diagnosis and medical treatment go hand in hand with the surgical handling of these cases. I feel I am fortunate in being so siuated as to be associated with three or four medical men where we handle these cases as a routine by combining or double-teaming, because very often we give a clinic in which a medical man first gives the diagnosis and the medical side of the case, and if it is an appropriate case the patient is at once operated on by the surgeon before the class. I am sure that this combination, this getting together, is the only way in which this subject can be worked out satisfactorily.

I have gone through the same experience that most surgeons have in the last five or eight years of operating on a certain number of cases which were medical and not surgical, and finding no improvement, or in leaving the patient in a worse shape than before. On the other hand, I must say that in properly selected cases there is hardly any group of surgical cases which are quite as satisfactory as the stomach cases, those that come to us with obstruction of the pylorus, whose normal weight, say, is 180 pounds, who have gone down to 120 pounds, whose lives are miserable, whose dispositions are absolutely changed because of the continual suffering. Those patients, after a simple gastroenterostomy has been performed, will within six months return to their normal weight and return to a condition of health where they can enjoy life. These cases are wonderfully satisfactory, and there are a great many of them.

There are two or three other points I would like to mention, and they are these: I agree perfectly with what Dr. Deaver has said and what has been emphasized so fully in the last few years by the Mayos, by Mayo Robson and Moynihan, that we have reached a point in the surgery of the stomach where we must demand absolute, tangible organic evidence before we resort to any surgery, after we open the abdomen. Undoubtedly, many gastroenterostomies have been performed which should not have been done. But we have reached the point where on exploration, if we do find absolute tangible evidence, we can go ahead with the appropriate treatment. If not, we should admit we have made a mistake, and make the operation purely an exploratory one. I have found in my work that it is absolutely impossible in a large proportion of cases to determine, even

at the time of exploration, even when we have the mass in our hands, a mass the size of a small potato at the pylorus, whether that is a carcinoma or an ulcer. I remember very well one case which I had with Dr. Sippy. It was very interesting to see the clinical diagnosis of that case made by Dr. Sippy of ulcer of the stomach. After making an exploratory incision and drawing the stomach into view, it was found to be a large tumor at the pylorus, with some enlarged glands. I said, "This is carcinoma," and Dr. Sippy agreed with me. I made a partial gastrectomy, removed a third of the stomach, including the pylorus. Immediately we split the specimen open, cut it in two, and we said carcinoma. We submitted it to our laboratory, and what was it? Not a carcinoma at all, but a huge thickening of the submucous tissue and the musculature about the pylorus superimposed upon the ulcer. There is a good example of difficulty in diagnosis. I am rather inclined to think that we did the proper thing in that particular case, and I should advocate in a similar case, where there was the possibility of carcinoma, the making a wide sweeping removal rather than simply a gastroenterostomy.

DR. CHRISTOPHER GRAHAM, of Rochester, Minn.: I am very glad to have had this opportunity of hearing Dr. Sippy's paper. I agree with him. I believe that if all cases of ulcer were treated properly, medically, a far less number of them would go to surgeons. I also believe that if we would teach our patients to eat properly, to masticate the food thoroughly, many less would go to the physician. So I am perfectly in agreement with what Dr. Sippy has said. I believe most ulcers of the stomach are medical and should be treated by medical men. It is refreshing to see and to hear surgeons acknowledge that they have made mistakes in these cases as medical men have, and I am glad to see the surgeon and the medical man getting closer and closer together, but I believe the surgeon has come down further than the medical man has gone up to meet him.

I want to say a few words about the cases that trouble us in making a differential diagnosis between ulcer of the stomach and appendicitis. There is a form of chronic intermittent appendicitis that gives the symptoms of chronic, complicated ulcer, in that the patient has no pain whatever in the abdomen; no sensitiveness at McBurney's point. There may be increased secretion, increased acidity. The patient will have vomiting and a whole train of symptoms which run a good deal as chronic ulcer runs. The symptoms are not so constant and lack the typical ulcer picture. There may be a little relief from food, but food usually brings the trouble on as in chronic ulcer. In a few of these cases there is considerable hemorrhage, and while a diagnosis of ulcer is made, no ulcer will be found. In many cases fecoliths are found. There has been no hemorrhage since operation and the patients have been all right up to the present time. Ulcer of the stomach has been diagnosed and mistaken for other conditions, operation made, and found to be quite unnecessary. The surgeon is getting to be a good deal more conservative; is a great deal more careful about doing gastroenterostomy, and he is demanding that there shall be signs of obstruction or perforation which shall really call for operation. We have seen a great many patients upon whom gastroenterostomy was performed again present themselves to the surgeon with their usual trouble, and a certain number of them, when the gastroenterostomy loop has been restored, would go on normally. But that trouble is lessening. The surgeon is learning that every case is not a surgical one; and he is now giving some little place to the physician, and the whole thing is readjusting itself gradually but surely.

DR. SIPPY (closing the discussion): Just a word lest we forget. I think we should, as we all do, acknowledge the enormous debt we owe to surgeons for having brought about this wonderful agreement between surgeons and medical men. After all, it was a surgeon who forged ahead and did more towards cleaning up and bringing about the present status as to whether ulcer of the stomach should be treated medically or surgically than the medical man has done. In this connection I want to bring up a practical point, emphasize it, and one which I think we ought to have in mind, namely, Virchow, with carefully collected statistics has brought out the point that 35 per cent. of all cases of carcinoma affecting the human body are located in the stomach. It is recognized, at least, that 10 per

cent. of all cases of carcinoma begin at the seat of ulcer. That is the lowest figure. One hundred per cent. of all cases of carcinoma coming from ulcer is the highest figure. Somewhere between these two extremes the truth lies, no doubt. Nowadays, nearly every patient afflicted with gastric ulcer goes to some physician on account of stomach discomfort and distress, asking for relief. That a large number of these cases are overlooked there can be no question. Is it not our duty, then, to go to work and prepare ourselves in such a way that we can recognise the symptoms of gastric ulcer early, so that these patients may be treated surgically and carefully, so that this demand on the part of the surgeon for operative procedure to remove complications and sequelæ would not result if the cases had been treated properly, and, more than all, prevent the tremendous waste of life from carcinoma of the stomach?

THE PROGNOSIS OF VALVULAR HEART LESIONS.

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One of the most interesting problems that comes up in connection with valvular heart lesions has to do with the question of prognosis. The patient will want to know first of all whether or not he has heart disease, as he calls it, and if he has it, how long he will live and whether he will drop dead suddenly. Entirely apart from the patient's desires and considered merely as a question of scientific interest, the prognosis should interest the physician as much as, or perhaps more, than any question that may arise, not even excepting the treatment of the case. It is manifestly impossible in most cases to put a definite limit of life on any one case. The most that one can do is to group the cases roughly and, by weighing the various factors, arrive at a judgment that in the individual case may err widely but on the average will be not far wrong. It is our purpose this evening to analyze these factors.

An accurate diagnosis is necessary before arriving at any conclusion regarding prognosis. The diagnosis should establish:

1. The valve involved and the lesion present—i. e., an insufficiency or a stenosis. This is often a relatively simple matter, as the diagnosis depends on well understood data. At times, however, especially in combined lesions and in the very slightest lesions, a diagnosis may be very difficult, and there will be a variety of opinions expressed by different men. As for the combined lesions, my experience has been that every one recognizes the important elements, the difference of opinion being chiefly in regard to slight lesions complicating more severe ones. In the slight lesions, or, better, where the question arises as to whether or not a lesion is present, the diagnosis is rather important. Perhaps mitral insufficiency comes most often in question, and concerning this I wish to state emphatically that a murmur in itself is not enough to make a diagnosis on. There must be some displacement of the apex outward, or other evidence of enlargement of the heart, and, unless there be some accentu-

* Read at the meeting of the Winnebago County Medical Society at Rockford, Ill., April 13, 1909.

ation of the pulmonary second tone, there is probably no lesion present in spite of a murmur. Very often such a murmur depends on anemia or some other change in the blood, so-called hemic murmurs, or there may be anatomical peculiarities in the chordæ tendinæ that cause the first tone to be muffled. These murmurs are most often heard at the base of the heart, in the third interspace just to the left of the sternum. They may be heard at the apex. It is to be remembered that the second pulmonary tone is often louder than the aortic in children. In adolescents and children when such an apparent accentuation is associated with a systolic murmur we are frequently forced to withhold our opinion till time shows us that the murmur is functional. The second aortic tone is often accentuated owing to a high tension associated with arteriosclerosis and in this case we may overlook a mitral leak. This occurs not infrequently in hospital cases when a murmur disappears on rest in bed. It may often be brought back by having the patient exercise. Another error that is frequently made is in diagnosing an aortic stenosis on a systolic thrill and murmur over the aortic area. If it is remembered that aortic stenosis is a rare lesion and should not be diagnosed unless there are other signs present, such as a decided muffling or absence of the second aortic tone and a slowly rising and long sustained pulse wave, we shall make this blunder less often. The systolic thrill and murmur found in the aortic area are most often due to aortic insufficiency, the result of arteriosclerosis of the valve, or to an aneurism; only rarely are they due to an aortic stenosis.

High grade mitral stenosis will often show only the evidences of broken compensation and may be diagnosed as a myocarditis. In these cases there are often no murmurs, or at most a systolic murmur that is interpreted as due to a relative insufficiency. The small, hard pulse, the high area of dullness due to dilatation of the left auricle, and a peculiar slapping quality of the first tone will often put us on the right track. I remember one such case that was decided by one of the men who remembered that on a previous stay in the hospital there was unmistakable evidence of a mitral stenosis present. On the whole, we may say that the diagnosis of the lesion is relatively simple.

2. The extent of the lesion. This is perhaps of more importance than is the diagnosis of the lesion itself. And right at the beginning we may say that the murmurs present offer us practically no aid, except that as a rule a loud murmur indicates a slight lesion and a relatively good condition of the heart muscle. A loud murmur which becomes weaker indicates muscle weakness as a rule. We shall have to get our chief evidence from other sources and I wish to emphasize the importance of the examination of the apex beat by palpation. Often enough we are not able definitely to locate the apex beat and must rely on percussion, but when we can locate it and can define it accurately we have definite and unimpeachable evidence of the exact condition of the left ventricle, since we can tell by the width of the apex whether or not this cavity is dilated and by the force of the impulse whether there is hypertrophy present and to a degree how much. The general precordial impulse and the epigastric pulsation give us information as to the right

ventricle, which is, of course, substantiated by our findings on percussion, and we may diagnose right ventricle hypertrophy on an accentuation of the second pulmonary tone, for this indicates increased tension in the pulmonary circuit and that in turn means more work for the right ventricle, which must have hypertrophied in order to do its work. From our information as to the size of the heart, then, we may diagnose the extent of the lesion. It will happen that there will sometimes be a considerable dilatation of the heart from a slight lesion when there is an associated myocarditis present. In these cases we may make an error in diagnosis, but the prognosis will be the same. As a rule a large heart means an extensive lesion and a slight change in the size of the heart means a slight lesion. As a corollary the question as to the stationary or progressive character of the lesion comes up. We may say that as a rule an insufficiency is apt to be stationary while stenosis is more apt to progress. Other factors enter here that will be discussed later.

3. Compensation. A very important question to decide is whether compensation is perfect or not. We can get important evidence regarding this point from the history. If there has been shortness of breath on exertion, cough, etc., present, then probably compensation is imperfect or on the edge of breaking. In the examination the different lesions must be considered separately. Mitral insufficiency entails hypertrophy and dilatation of the left ventricle, dilatation of the left auricle, increased tension of the pulmonary circuit and a consequent hypertrophy of the right ventricle. Dilatation of the right ventricle is not a necessary part of the picture, and when it occurs it means an imperfect compensation. Clinically this dilatation shows itself in a displacement of the right border to the right. Hypertrophy of the right ventricle will not in itself change the right border much. So that we may say that a displacement of the right border beyond the right border of the sternum on moderately deep percussion means an imperfect compensation. In mitral stenosis there is always some insufficiency present, and the only further statement necessary is that a high-grade stenosis is never perfectly compensated. In both mitral lesions the results are the same—i. e., passive congestion of the pulmonary system, as shown by bronchitis, edema, etc.; passive congestion in the portal circuit, as shown by an enlarged, tender liver and ascites, and passive congestion in the systemic venous system, as shown by edema of the dependant portions of the body, especially the legs. Aortic lesions, when compensation fails, show the same symptoms and signs as mitral lesions. There may develop a relative mitral leak from dilatation of the left ventricle or the symptoms and signs of broken compensation may develop without there being any relative valvular leak. When there are both aortic and mitral leaks present it is often difficult to say whether the mitral insufficiency is primary or is a relative lesion due to dilatation. Often this is impossible to determine, since in the cases due to arteriosclerosis of the aortic valve the anterior cusp of the mitral valve is often affected. It is worthy of note also that an aortic leak due to an acute endocarditis almost never occurs alone, the mitral being also affected in the majority of the cases.

4. Cause. Pathologically there are two important groups of cases of valvular lesions. In the one group where an acute endocarditis has occurred the valve curtains are thickened and retracted from scar contraction and the chordæ tendinæ are thickened and shortened. Frequently the cusps of the valve are adherent. The changes in these cases are always on the free edge of the valve, the attached margin being unchanged. In the other group the valve changes depend on primary changes in the aorta and occur by a process of extension from the aorta. Hence the attached margin is thickened, and often, indeed, calcareous. The valve segments become thickened and do not coapt perfectly or the opening may be stenosed. The aortic valve is most frequently involved in this sclerotic process, though the mitral may also be involved, owing to the fact that the anterior cusp arises from the aortic ring. The mitral valve is most frequently involved in the acute endocarditis process. Acute endocarditis is, of course, most often the result of acute articular rheumatism, though it may occur with scarlet fever, septicemia, pneumonia and other acute infectious diseases at times. Often enough we can get no history of any preceding acute infection and still find at autopsy the characteristic lesions resulting from an acute endocarditis. This does not appear strange to us when we consider how frequently we meet in hospitals obscure infections that, by the subsequent development of valvular lesions only, we recognize as acute endocarditis. Many cases of valvular lesions give a history of "malaria" or other acute diseases that were nothing more nor less than acute endocarditis that was not recognized as such. The etiology of the primary sclerotic process is the same as that of arteriosclerosis. Syphilis, alcohol, lead, hard physical work, over eating and the stress and worry of active business life are the most important factors. We can usually find in these cases more or less sclerosis of the peripheral arteries with a high blood pressure and often a sharp ringing second aortic tone. There may also be evidence of chronic interstitial nephritis, as shown by an increased amount of urine of low specific gravity, with a trace of albumen present at times and hyaline and granular casts. Often enough there is the nervous and mental evidence that we associate with cerebral sclerosis, such as paresthesias, numbness or transient monoplegia, headache, dizziness, syncopal attacks, etc. It is of the utmost importance to recognize these two groups of cases, for the prognosis is much different in the two groups. In the primary sclerotic group the vessels of the heart itself are often involved with the production of chronic myocarditis, angina pectoris, etc., and the patient may drop dead from an acute dilatation of the heart. Then the lesion is more apt to be progressive. These cases occur as a rule later in life, from 40 years up, but it must be remembered that they may occur in the thirties, and even in the second decade. A tendency to an early sclerosis frequently runs in families and we get a history of father, grandparents, uncles, cousins, etc., dying at 40, 50 or 60 odd years of apoplexy, "dropsy," angina pectoris, or other manifestations of vascular mischief. In the group due to a primary acute endocarditis the lesion is less apt to progress, the heart muscle is not so often involved and the condition occurs more often early in life.

Having made a diagnosis not only of the lesion, but also of its extent, the condition of compensation and the cause of the lesion, we are ready to consider the prognosis. As regards the prognosis in the different lesions we find a variety of opinions expressed. There is no question that mitral insufficiency offers the best prognosis of all, and, taking all the cases of aortic insufficiency, this offers the poorest prognosis. If, however, we separate the latter group as to the cause we find that the cases due to a primary acute endocarditis offer almost as good a prognosis as does mitral insufficiency. Both aortic and mitral stenosis are more severe, and again we must separate the slight from the severe instances of mitral stenosis. The milder cases of the latter, where there are no pulse changes but the predominating condition is the insufficiency that is always present, offer almost as good a prognosis as mitral insufficiency alone. The severe cases, on the other hand, offer almost as serious a prognosis as does aortic insufficiency due to arteriosclerosis. We should arrange the lesions then in the following order of increasing danger:

1. Mitral insufficiency.
2. Mitral stenosis of slight degree.
3. Aortic insufficiency due to acute endocarditis.
4. Aortic stenosis.
5. Mitral stenosis of high grade.
6. Aortic insufficiency due to primary chronic endocarditis.

Combined lesions for the most part have already been considered. Thus it has been noted that practically every case of mitral stenosis shows more or less insufficiency and that many of the cases of aortic insufficiency show more or less mitral insufficiency. In both these cases the mitral leak does not affect the prognosis very much. In combined aortic and mitral insufficiency there is frequently found a presystolic murmur just external to the apex, and the question arises whether this murmur indicates a stenosis at the mitral orifice or whether it is the so-called Austin Flint murmur. Frequently the only decision that can be arrived at is that the stenosis, if present at all, is very slight. Where tricuspid insufficiency is diagnosed, together with a mitral or aortic and mitral lesion, it would be hard to say whether this is a primary or a relative lesion. Where with improvement the signs of tricuspid insufficiency disappear we may diagnose a relative lesion positively, and in general it is to be remembered that a primary tricuspid lesion is very rare and should almost never be diagnosed, particularly when compensation is imperfect. A primary tricuspid lesion is to be suspected, however, when portal stasis is much more marked than is systemic stasis. This marked disproportion occurs chiefly in right heart lesions, whether due to valve disturbances or to passive congestion in the lungs, due to emphysema. It also occurs in adherent pericardium.

The extent of the lesion affects the prognosis directly—i. e., the more extensive the lesion the poorer the prognosis.

Compensated lesions offer, of course, a better prognosis than do uncompensated lesions. Broken compensation is, in fact, a bad prognostic sign, but here the cause of the break is important. If it occurs after

very severe exertion, as in mountain climbing, the heart may once more regain its tone, while if the break occurs in the course of ordinary pursuits, the prognosis is, of course, grave. I remember a case, however, at the Cook County Hospital where we made a blunder in prognosis from too closely following this rule. We had watched a case develop a mitral and aortic insufficiency following an acute rheumatism and had kept the patient very quiet. One day he went to clinic and during the clinic became faint and showed a rapid, irregular pulse, with some evidence of dilatation. He improved somewhat and wanted to go home. We advised against this, and, when he insisted, cautioned him to be very careful and told him how grave his trouble was. Three months later he entered the hospital again on account of an acute bronchitis and told us he had remained at home only two days. Then he went to work as a switchman in a freight yard and had worked ever since. His heart was perfectly compensated, and, except for his acute bronchitis, he was in good shape. Evidently his experience in the clinic had been of a purely nervous character.

As regards the effect of the cause of the lesion on the prognosis, enough has already been said.

Certain personal factors are important. The age of the patient, for example, will affect our prognosis. In general we may say that the prognosis is best in adolescence and early adult life and grows grave as age increases. The reason is that the young have a better general and especially cardiac tone and the heart muscle has more reserve to draw on. It is entirely a question of heart muscle. In children, on the other hand, the onset of puberty is apt to draw heavily on the reserve and may overbalance a well compensated lesion. Then the frequent recurrences of the acute process add a further strain, so that the prognosis must be more guarded than in adolescents.

Sex is not of so great moment in children, though girls as a rule are easier to control than boys. In adult life it is to be remembered that men are more exposed from their occupations and are more apt to have bad habits than are women. In the latter pregnancy is of questionable effect. I have seen some cases where an acute endocarditis has developed on an old lesion from an infection during delivery that would probably not have been of any importance in a healthy woman. Then at times a well-established compensation becomes broken, but, on the whole, it is surprising how well these cases do. At the best pregnancy must be understood as introducing a doubtful element into the prognosis and, therefore, must lead us to be very guarded in our opinions.

The habits of a patient are of importance in the prognosis. Excessive use of alcoholics is, of course, bad, as are other excesses. Hard outdoor work in all kinds of weather is hard on an already weakened heart and will tend to strain the compensation to the breaking point. At the same time, too much coddling, especially in children, will not permit the development of normal general resistance. The necessity for earning a livelihood at whatever kind of work the patient is fitted to do makes the social status of the patient an important factor in the prognosis. As a general rule the chances are better in those individuals of the

better class whose mode of life may be fixed by choice and not by necessity.

The importance of the family history has been mentioned above in discussing the cause of the lesion. A family tendency to early arteriosclerosis gives, of course, a relatively bad prognosis.

Certain associated conditions may be of great importance in the prognosis. Of those affecting the cardiovascular apparatus there are especially pericarditis, arteriosclerosis and high blood tension. Pericarditis, as is well known, frequently occurs in acute articular rheumatism and may rarely give rise to adhesions between the layers of the pericardium and between the latter and the other structures in the mediastinum. The latter condition, as you know, embarrasses the heart action and soon leads to dilatation and broken compensation. But, apart from these cases of so-called concretio cordis, there is another fact to be borne in mind—namely, that in every case in which the pericardium and the endocardium are involved the myocardium is also affected. This may be only to a slight degree, or it may be so severe that the heart never becomes compensated and death occurs from heart failure within a few months of the original infection. The condition in these cases may well be termed pancarditis, and this possibility must be borne in mind in every case of pericarditis. The local effect of arteriosclerosis on the heart muscle, etc., has already been considered. The effect of long continued high tension, with or without arteriosclerosis, is, of course, bad, in that the work of the heart is thereby materially increased. Such an increase in tension occurs in all forms of Bright's disease, but especially in the chronic interstitial nephritis. Emphysema is also an important factor, since it raises the pulmonary pressure and thereby embarrasses the right heart. All of the diseases that are followed by general disturbances of nutrition would modify our prognosis, since the heart would be involved with the rest of the body. Then it is to be remembered that any acute infection that a healthy person would stand may close the scene, and of these the most important is pneumonia. The importance of pneumonia as a terminal infection in chronic diseases was well shown in a series of 174 autopsies on cases of pneumonia at the Cook County Hospital which I reported. Dividing the cases in three groups, one with no chronic lesions, one with so well marked lesions as to be recognized clinically and a third in which there was some chronic lesion found at autopsy that was not reognized during life, I found these groups of almost equal size, showing that in two-thirds of these cases pneumonia was a terminal infection.

Finally note is to be made of certain accidents that may happen in cases of valvular disease. Embolism may occur, for instance, especially in mitral stenosis, where the dilated auricle permits the formation of thrombi, which on occasion are swept into the blood stream and carried most often up by the innominate and right carotid artery to lodge in the middle cerebral artery with the production of hemiplegia or even death. Sudden death may also occur from dilatation of the heart muscle when the latter is degenerated as the result of sclerosis of the coronary arteries. If one has the opportunity of visiting the autopsies

held by the coroner's physician in a large city he will shortly come to understand the extreme importance of this condition as a cause of sudden death.

We may summarize our conclusions as follows:

1. An accurate diagnosis must be made of the lesion, its extent, the condition of the heart as regards compensation, and the cause of the lesion.

2. The cause of the lesion, the age, sex, habits and family history of the patient, and the presence or absence of general and local diseases are important in prognosis, chiefly from their effect on the heart muscle.

3. The condition of the heart muscle is the most important factor in the prognosis of valvular lesions.

103 State Street.

MUSCULAR POWER IN TENOTOMY AND TENOPLASTY.

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CHICAGO.

When the tenotomy of contracted muscles came to be generally recognized by the introduction of the subcutaneous method the facilities created by this simple, harmless and effective method in the treatment of contraction deformities were looked upon as indicating a new era in orthopedic surgery.

We need not be surprised at the overwhelming appreciation of this operation before the time when the plastic operations have been practiced; nor are we at a loss to understand the preference the former method is given even now if we consider the practicability and harmlessness of its technic. But the question must be raised, if we do not grant too large a field of indications to an efficient and appealing method; if the operation also meets the physiological requirements which will have to be provided for the tenotomized muscle after it reassumes its function; and finally, this not being the case, if not certain restrictions would have to be placed upon the indication of the tenotomy.

Supposing the tendo Achilles is to be severed in a case of partial paralysis of the peroneal nerve resulting in front foot drop and contraction of the triceps surae. Before the operation the tendon of the muscle is in a state of nutritive shortening, provided the disturbance has been established for a sufficient length of time. The muscle itself is in a state of contraction exceeding the normal tension of the muscle, due to the lack of full action of the antagonists, but not yet in the state of extreme contraction, owing to the rest of the antagonistic force still present.

When the tendon is divided the muscle at once, being free from the antagonistic counteraction, assumes the state of extreme contraction, exhausting its rest of contractibility, pulling apart both ends of the divided tendon. The gap, after correction of the deformity, amounts to 4 cm. and more, especially if the tendon has been divided at some distance from its insertion on the tuber ossis calcis, as it is the rule.

After a few weeks the gap is bridged by connective tissue and it is regarded as one of the triumphs of the achillotomy that the divided ends hardly ever fail to reunite.

The result of the operation, therefore, is some shortening of the belly of the muscle (increased contraction) and considerable lengthening of the tendon of the muscle. In order to judge the significance of these muscular conditions in regard to the muscular efficiency we have to recall certain physiological facts.

First, the power of the muscle is largest in the beginning of the contraction, decreasing gradually toward the point of extreme contraction, where it is equal to nothing. Beyond the point of the least contraction the elasticity of the muscle will be claimed for by any further

extension, reaching, however, its limit very soon. Thus, for every muscle there exists an optimum of activity (maximum of disposable energy) at the very beginning of the contraction and a minimum of activity (minimum of disposable energy) at the end of the contraction.

From these considerations we may very easily conclude that, while we are able by tenotomy—i. e., lengthening the tendon and shortening the belly of the muscle—to give the latter an anatomical shape that will permit the desired correction of the deformity, we, on the other hand, deprive the muscle of a certain amount of activity, which rather culminates in shortening of the tendon (comparatively) and lengthening or extending the belly of the muscle.

Yet we are able to furnish the latter condition for the muscle by tendoplasty, when we divide the tendon, correct the deformity and then unite the tendon, exerting a certain extension on the belly of the muscle. Now, in drawing any practical conclusions from these facts, I think I

can not be too careful in restricting the indications. I am fully aware that in many cases of anterior poliomyelitis the paralysis is so extensive that the correction of the deformity furnishes the foremost indication, while the gain of some muscular power is a question of minor importance. Furthermore, tendons that have been rendered too long by tenotomy will adapt themselves to a functionally suitable length after a certain time.

But there are cases of partial paralysis in anterior poliomyelitis and cases of spastic paralysis in polioencephalitis where it is worth while to carefully preserve the muscular power by performing Achillo-tendoplasty instead of achillotomy. I will only quote a well-known cases of Lange.[1] A double side achillotomy performed on an 18-year-old youth for paracases of partial peroneal paralysis with front foot drop I found that the in spite of proper plaster of Paris fixation, owing to the functional weakness of the tendon. Normal function of the muscle was established only after the tendon had been properly shortened by folding. In several cases of partial peronial paralysis with front foot drop I found that the plasty of the tendo Achilles gives a good functional result as soon as union is accomplished, so that often fixation in plaster of Paris for 4 to 6 weeks proves sufficient for maintaining the foot in corrected position. The photograph shown (Fig. 1) concerns a case of tendoplasty where the cast was removed after 4 weeks, the tendo Achillis proving to be in good condition. The ability of standing on the toes is, I think, a good test for the muscular efficiency of the triceps surae.

I do not intend to do more than to put in a plea for performing the tendoplasty in preference to the popular tenotomy in certain cases, on the ground of the physiological shortcomings which adhere to the latter method.

100 State Street.

IMMUNITY.

A REVIEW OF OUR KNOWLEDGE CONCERNING TOXINS, ANTITOXINS, AGGLUTININS, PRECIPITINS, CYTOLYSINS AND BACTERIOLYSINS.*

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WAUKEGAN, ILL.

This paper will contain nothing original, but is simply a careful review of the subject, the facts having been gathered from Adami's General Pathology. My reasons for presenting this subject are that it is one of great and steadily increasing importance and judging from the knowledge, or rather lack of knowledge, of this subject among the leaders of the local profession, who, I am sure, are fully as up-to-date as the average general practitioner, I am satisfied that the rank and file

1. München. med. Wchnschr., 1902.

* Read before the Waukegan Clinical Society in January, 1909.

of the medical profession have rather vague ideas concerning these very important topics and I believe that the facts presented will be both new and interesting to the majority of physicians, who either have not the time or the inclination to study the subject carefully in the latest works on pathology. This paper will be followed by another, which will review the subject of opsonins, aggressins, anaphylaxis, phagocytosis and the side-chain theories of immunity. I shall, of course, try to present only the most important facts, for it would require a volume to cover the subject with any degree of thoroughness.

Immunity may be defined in a general way as an adaptation or modification of the system which affords protection against influences which without such adaptation would bring about cessation of activity and finally death. Speaking broadly, the individual may be regarded as having gained through inheritance a relative immunity within certain limits toward the action of all physical, chemical and organized agents which constitute his normal environment. In the course of infectious diseases and those caused by certain organic substances there are developed within the system certain substances or so-called "antibodies," by means of which toxic matters become neutralized so that the system becomes protected, the morbid process subsides and the convalescence follows. This is the process of immunization which makes the majority of infectious diseases self-limited and gives them a favorable ending.

It would be interesting but would require altogether too much time to review the history of the investigation into the nature of infection, immunity and the various injurious and protective agents. Among those whose names will always be illustrious in medical history as the pioneers and greatest investigators in this most important field of science are Jenner, Koch, Pasteur, Ehrlich, Metchnikoff, Brieger, Roux, Yersin, Behring, Lister, Pfeiffer and Kitasato. Hankin of Cambridge in 1888 first isolated defensive bodies from the tissues and showed that these neutralized the toxins of the bacteria. Büchner in '89 made similar observations and named the bodies which he isolated alexins. These two men laid the foundation of our knowledge of so-called antibodies. Several observers during the next few years found that the blood-serum of animals, which had become immunized against pus infection and rabies respectively, when injected into other animals, conferred immunity upon them also, and these observations led up to the great work of Behring and Kitasato in diphtheria and tetanus. Roux did great service in developing the practical methods of employing diphtheria antitoxin. The investigations of these men revealed the existence of another form of immunity, called by Ehrlich passive immunity, not produced by the reaction of the infected animal, but due to introduced antitoxic substances in contradistinction to the active immunity induced by such reaction.

Since the fundamental work of these men in 1890-91 there have been great advances in detail, both in confirmation of their results and in further analysis and determination of the nature and mode of action of the bodies known as toxins, antitoxins and other offensive and defensive agents. Ehrlich and Pfeiffer have done splendid work along these

lines and Bordet, in his able study of the process of hemolysis, published in 1898, showed that immunity was dependent in most cases not only upon one but upon two bodies, the one called "complement," present in the normal system, and the other called the "amboceptor," or "specific immune body" developed in reaction to the presence of toxins. Another important discovery was that of Martin and Cherry, who found that toxins and antitoxins form chemical combinations, and so also was the discovery of Preston Kyes in 1903 that a body of approximately known character and composition—viz., lecithin—can take the place of one of the bodies entering into this chemical union. To Bordet and Ehrlich also we owe the knowledge of the formation of cytolysins—i. e., the development in the organism of substances which protect against and destroy the cells of other species or of other individuals of the same species—these substances being developed as the result of progressive inoculation of this particular order of cells.

Having taken this cursory glance at the history of this great science, let us now proceed to review the present knowledge of this most important field and consider quite carefully the nature of toxins, antitoxins and the various related substances. There is no exact definition of a toxin. The usual definition is a poison against which it is possible to gain immunity by means of an antibody, but this definition includes not only bacterial products but also various vegetable poisons, animal and vegetable enzymes, animal venoms and certain animal cell substances. Toxins are characterized by the following properties—viz., they are, one and all, the products of cell metabolism, they act in most minute doses, they diffuse with difficulty, and so far not one of them has been positively obtained in a state of purity. They are closely allied to proteins, if not exactly proteins, and are of a colloid nature, as shown by their low diffusibility. The more readily diffusible toxins are called exotoxins, while those very slightly, or apparently not at all diffusible, are called endotoxins. These exotoxins may be regarded as cleavage products of protein metabolism. When these bacterial exotoxins are inoculated into the blood of an untreated animal they rapidly disappear. Sometimes within a few minutes the blood is found innocuous. This in the non-immunized animal is not due to any process of neutralization occurring in the circulation, but to absorption by the leucocytes and by various tissue cells. If tetanotoxin be employed, the blood loses its toxicity, while all other organs with one exception give extracts that are toxic. This one exception is the brain and nerve matter with which the toxin enters into so intimate a combination that it can not be separated as it can from all other organs. It has been found that only such cells and tissues as these which, so to speak, anchor the toxins eventually develop the antitoxins and it has by other methods been demonstrated that antitoxin production occurs only in those individuals whose cells have the specific power of binding the toxin in a firm union. For specific antitoxins to be produced there must first have been a direct union with, and action upon, the cell substance on the part of the toxin. It has also been demonstrated that by subjection to heat and by other methods

the diphtheria toxin can be so modified that its toxic action is greatly lowered or entirely lost so that it is quite harmless and yet, when inoculated, such modified toxin leads to the development of antitoxin. The existence of the modified toxins or so-called toxoids and their capacity to induce immunity afford proof that the toxin molecule consists of at least two subordinate groups, one that anchors the toxin on to the cell substance, called by Ehrlich the haptophoric group; the other, called by him the toxophore, being able when present to so influence the cell activities as to set up toxic disturbances. An interesting experiment by Morgenroth confirms the existence of these two groups—haptophores and toxophores. He took three frogs and injected tetanus toxin into them without obvious effect, for at ordinary temperature these cold-blooded animals are not susceptible to tetanus. These he kept for several weeks in the cold. Had the toxin been still circulating in the blood the subsequent injection of tetanus antitoxin would have neutralized it; had it been excreted no symptoms would have developed. But when these frogs were warmed symptoms of tetanus appeared. The only possible explanation is that the toxins had become anchored to the nerve cells and, being so combined, could not unite with the circulating antitoxins. But, if so, then the haptophores must have united with the nerve cells in the cold and the toxophores only became active when the temperature was raised. Ehrlich has shown the existence, more particularly in old toxin solutions, of a series of modifications of the toxins, so-called protoxoids, syntoxoids and epitoxoids, and also bodies, which have little affinity to toxins, and which he called toxones. The active toxins themselves may show variations in their readiness to combine with antitoxins, and Ehrlich distinguished these variations by the names, proto-, deutero- and tritotoxins.

We now come to the very interesting question of just how the antitoxin is produced. It used to be thought that there was a direct conversion of the toxin into antitoxin, but this is certainly not so, for the amount of antitoxin produced is far out of proportion to the amount of toxin injected. It has been shown that the toxin unit in a horse immunized against tetanus leads to the production of about 100,000 antitoxin units. It is therefore doubtless true that, while the toxin stimulates the cells in the first place, yet it is the cells themselves which assimilate the necessary constituents and build up and discharge the antitoxins into the circulation. The manner in which this is brought about is undoubtedly best explained by Ehrlich's side-chain theory. Indeed there has been no other explanation offered which is at all satisfactory. We have already seen that the toxin or toxin molecule has its haptophore and toxophore. According to Ehrlich's theory, the large cell molecule has not only one but several orders of haptophores or anchors by means of which it attracts and combines with itself all the various orders of foodstuffs. Ehrlich calls these anchors or haptophores, receptors, and to these receptors the haptophores of the toxin molecules become attached. These receptors of the cell molecule are the side-chains of Ehrlich's theory, and thus certain groups of unsatisfied side-chains attract and combine with

the haptophores of the toxin molecules. The toxin molecules, if the toxin is not too strong for the cell molecule or if too many toxin molecules do not become attached to the cell molecule by these side-chains, will be neutralized by them. Such neutralizing receptors or side-chains are called intracellular antitoxins.

Now, how is free antitoxin discharged into the blood? According to Ehrlich, the very act of combination of the toxin molecules with the receptors stimulates the cell substance to reproduce more of these particular receptors or side-chains than is necessary and then the overproduction or excessive side-chains are discharged from the cell into the blood. This view is based upon Weigert's law of inertia—viz., that once a cell is stimulated to perform a certain act it continues to perform that act for some time after the stimulus has ceased to act. Adami, however, does not fully agree with Ehrlich's theory, stating that this production of side-chains or antitoxins continues for a longer period than was contemplated by Weigert, and that his law does not explain why the anchoring of the toxin by a particular side-chain acts as a stimulus to the production of new side-chains of the same order. He also believes for certain reasons that there is a normal discharge into the blood plasma of a large number of "potential" antitoxins—i. e., of antitoxins having affinities for certain toxins—and that it is only when these toxins enter the system that the particular antitoxins become developed in relatively enormous quantities. Adami believes also that the toxin molecule, instead of becoming fixed to the cell molecule by means of the receptor or side-chain, removes and separates the side-chain from the molecule. He says that the known facts regarding the extraordinarily minute quantities of toxin capable of causing death of relatively large animals leads him to believe that ferment action must play a part—viz., that the toxin molecule, having separated one side-chain, becomes liberated from this and free to separate another side-chain, until, by disintegrating the cell molecule more rapidly than it can build itself up, it causes dissolution and death of the cell. When the toxin, however, does not cause cell dissolution and death, its continued existence for some time within the cell causes the overproduction of side-chains or antitoxins, and these, being developed in excess of the needs of the cell, are discharged into the circulation. Considerable more might be said on the nature of the union of toxin with antitoxin, but, not to take up too much time, I will state only two or three interesting facts—one is, that a combination of toxin and antitoxin, which is absolutely neutral for individuals of one species, may be fatal for those of another species. Another fact which has been found true for quite a number of toxins is that if the amount of toxin has been accurately determined which, added to a given amount of antitoxin serum, completely neutralizes it, and if now only half the amount of the required toxin be added and then after some time the other half be added, the result is not a neutral but a toxic mixture. There are two explanations of this result, one being that there are present, besides the active toxin, certain toxoids which unite with part of the antitoxin when only part of the required amount of toxin is added but not when all of it is added, so

in the first case part of the toxin is left uncombined with antitoxin. The other explanation is that it is due to enzyme or ferment action. Another interesting fact is that if a mixture of tetanus toxin and antitoxin, in which the toxin is in excess, be diluted with water, the toxicity is decidedly increased. Jacobi believes that this is due to hydrolytic dissociation of the toxin and antitoxin.

How does antitoxin act upon toxin within the body or how does antitoxin introduced into the body bring about the cure of infection? Experimentally we find that the smallest amount of antitoxin is required and the least evident disturbance of the system occurs when toxin and antitoxin are introduced at the same time, and least of all when the two agents have been in contact for some time. When symptoms are already present much larger quantities of antitoxin are required and when the disease has been active for some days, no amount of antitoxin will prevent the fatal result in the large majority of cases. No fact is better established than this, especially in the treatment of diphtheria. I will not enter into any long explanation of this well known fact, but will simply give Adami's conclusions in his own words—"We would conceive antitoxins introduced into the system as (1) neutralizing any free toxin molecules in the circulating fluids of the body and so preventing their action upon the cells and (2) as gaining entrance into the cells and there, not so much acting directly upon the toxin molecules present (for they are already combined) as affording to the biophores or cell molecules that excess of side-chains necessary to build them up again and to neutralize the toxin molecules should they become temporarily free—in other words, affording to the cell physiological rest, together with the particular assimilable matter which has been used up by the activity of the toxin."

We will now proceed to consider three important and interesting conditions related to bacterial action—viz., the production of agglutinins, precipitins and bacteriolysins. I shall try to state the most important facts connected with each of these conditions clearly but, at the same time, concisely. The most familiar example of bacterial agglutination or formation of agglutinins is the well known Widal test, in which the blood serum of a patient with typhoid fever causes agglutination or clumping of the typhoid bacilli in a fresh culture. Adami says that Grünbaum, working under Gruber, observed this phenomenon several months before Widal's paper was published, and the test ought therefore to be called either the Gruber-Widal or Grünbaum-Widal. Agglutination consists, then, in the clumping of free bacteria suspended in physiological salt solution or broth, when there is added to this suspension some of the homologous serum—i. e., serum of an animal which has been inoculated with bacteria of the same species. With this clumping the bacteria, if previously motile, become motionless. The reaction is obtained with a great number of pathogenic bacteria, typhoid, tubercle, and anthrax bacilli, pyo-, strepto- and pneumococci, and many others. It is specific to this extent, that, with relatively high dilutions of the homologous serum, only the specific bacteria become agglutinated. It is non-specific to the extent that, with more concentrated serum, bacteria of

allied species may also show agglutination. The reaction may be followed under the microscope, but is easier to follow with the naked eye, showing a gradual flocculus formation and sedimentation, either in pipettes, long tubes or watch glasses.

It would require too much time to consider in detail the properties of agglutinins or the exact cause and nature of agglutination, but a few of the interesting facts can be given. Agglutinins are relatively highly resistant, withstand drying for many months even when freely exposed to the air and are little affected by light or putrefaction. Most of them when moist can be heated to 62° C. without injury, although a few, including the tubercular, are rendered inactive at 56° C. Like the antitoxins, they may be present in normal serum. Normal human serum, when concentrated, has been found to cause agglutination of many bacteria and even when diluted thirty times, it may cause clumping of typhoid bacilli. Fetal blood however and that of healthy children under the age of seven, have very feeble agglutinating powers. Clumping is produced both with living and dead bacteria and can be developed in the blood serum by the inoculation of dead cultures. By inoculation of cultures the agglutinating power of the serum can be so increased that one observer obtained clumping of typhoid bacilli in blood serum diluted 1 to 1,000,000 and another observer obtained clumping of colon bacilli in serum diluted 1 to 2,000,000.

Much more might be said on this interesting subject, but I will give only the most reasonable explanation of the process of agglutination. Bordet believes that as the result of the action of the agglutinins there is an alteration in the molecular attraction or tension between the bacteria and the fluid medium. He believes that there is first a junction or union of the agglutinins with the constituents of the bacterial cell and second, a physical action on the bacteria by means of the salts in the fluid medium. He considers it, in fact, a process of the same nature as the gathering of the red corpuscles into rouleaux or rolls, when the blood clots. Sir Lauder Brunton has shown that if matches to represent bacilli and disks of cork to represent blood corpuscles be covered with hard soap and thrown into water, they float about free and isolated until the water is slightly acidulated, when they immediately gather in clumps. If the water is made slightly alkaline and the clumps broken up, they will not form again. More recently one observer has shown that red corpuscles have a fatty surface layer—viz., lecithin—somewhat similar to the soapy layer of the experiment. This observer believes that, through alteration in the physical condition of the environment, the surface of both corpuscles and bacteria becomes so modified as to lead to the physical attraction and adhesion of these bodies.

We now come to the second of the trio—viz., precipitins. It was shown by Kraus in '97 that if an animal is inoculated with fluid cultures of typhoid, cholera or plague bacilli and then, after some days, some of the blood serum of the animal is added to the germ-free culture fluid, a specific precipitate appears in the mixture. The same results occur also if a germ-free culture of the bacilli—i. e., one from which the germs have been filtered—is used for inoculation. It has been found

that the reaction is caused by the proteid substances which are present in the culture. Through the inoculation of these constituents of the culture broth certain so-called antibodies are developed and appear in the blood and these, combining with the bodies present in the culture fluid, cause the precipitate. Such antibodies, first known as coagulins, are now classed as precipitins and a large number of them have been produced by injecting animals with protein-containing fluids of various orders, not only of animal, but also of vegetable origin. Such protein-containing fluids are milk, horse serum, eel serum, human serum, sheep and ox blood globulin, pseudo-globulin, peptones, pleural exudate, albuminous urine, albumin of egg, muscle, serum, casein, milk and vegetables, and also wheat, rye and barley albumoses. These are to a large extent specific—i. e., the blood serum of an animal treated with wheat albumose will cause a precipitate in a solution of wheat albumose, but not in solutions of barley or rye albumoses. The serum of rabbits treated with cow's milk will cause a precipitate in cow's milk but not in goat's milk and what is of considerable importance in some medico-legal cases, the serum of rabbits injected with human blood will cause a heavy precipitate in human blood serum but none in the blood serum of dogs or goats. Certain precautions should be observed, however, in making the last named test, for Grünbaum has shown that the precipitins, developed by injecting into other species of animals the blood of the gorilla, chimpanzee and orang-outang, will each of them cause precipitates in the blood serum of all three species of ape and also in that of man, although they are without effect upon the blood sera of lower animals. While this may be quite a point in favor of the Darwinian theory, yet most of us, I am sure, will not care to be at all intimate with our new but very unattractive blood relations. It has been found, however, that the precipitation is most marked with the homologous serums—i. e., with the serum against which the proof animal was inoculated—and if this precipitin-containing serum be diluted, a point will be reached at which it will still react in a given time with the homologous serum but not with the others. So our relationship with the apes is not so very close after all. If cousins, they are a number of degrees removed and then some. Much more might be said on this subject, but I will add just a few words about the nature of the precipitins. They resemble in properties the other antibodies producible in blood serum; they can be precipitated by various reagents and can be isolated from the bulk of the proteins present in that serum by fractional precipitation—i. e., by making successful additions of ammonium sulphate and filtering off the successive precipitates the precipitins are brought down along with certain globulins and can be redissolved with these. In fact, they can not be separated from the globulins and so it seems probable that these globulins, appearing in the blood serum of inoculated animals, appear there as the result of cellular reaction and activity and if different orders of cells take up at the same time the inoculated material, it is also probable that their reactions vary and that they discharge into the blood these precipitins which vary from them slightly in constitution. Adami also believes that there

may exist or be developed, besides the precipitins, certain antiprecipitins and also precipitoids, bearing to them the same relation as antitoxins and toxoids do to the toxins.

We will now consider the last and most important of the trio, the bacteriolysins or bacterial solvents. The subject of bacteriolysis is, however, more easily understood by first considering a few of the important phenomena of cytolysis and hemolysis or cell and blood corpuscle solution. The serum of guinea-pig's blood has normally very little effect upon rabbit's blood and blood corpuscles, but if rabbit's blood corpuscles are injected into a guinea-pig, the latter's blood serum becomes in a few days extremely active and if some of it be added to a mixture of rabbit's red corpuscles and water, there quickly follows extensive dissolution of the corpuscles with escape of hemoglobin, so-called hemolysis. In order to prevent the formation and possible interference of precipitins, washed red corpuscles are used. This active blood serum of the guinea-pig is called immune. If this immune serum is heated to between 55° and 60° C. before adding it to the suspension of red corpuscles, it produces no effect and it is hence called inactivated immune serum. But now if normal blood serum from either guinea-pig or rabbit be added to this mixture of inactivated immune serum, red corpuscles and water, hemolysis occurs. In other words, neither the normal serum or the inactivated immune serum of the guinea-pig, if added separately to the rabbit's red corpuscles, cause hemolysis, but if added together they cause hemolysis, as does also the active immune serum alone. It is, therefore, proven that the union of two constituents with the corpuscles is necessary in order to cause hemolysis. One is present in the normal blood serum and is called the complement. The other is present in the inactivated immune serum and is called the immune or intermediate body or amboceptor. Neither can cause hemolysis in the absence of the other, but both are present in the active immune serum. It is believed and practically proven that the complement can not unite with the corpuscle directly, but does so by means of the intermediate body or amboceptor, which can become attached to both complement and corpuscle and forms the link between the two, whence comes its Latin name, meaning double-holder. It is believed also but not fully proven, that, just as there are toxoids and antitoxins, so there are complementoids and anticomplements and also amboceptoids and antiamboceptors, the anticomplements uniting with the complements and so preventing the union of the latter with the amboceptors and the antiamboceptors uniting with the amboceptors and so preventing their union with the corpuscles. The process of bacteriolysis is practically the same as that of cytolysis or hemolysis, the bacterium simply taking the place of the cell or red corpuscle. The phenomena of bacteriolysis have been observed in this way. Several times the ordinary fatal dose of an agar culture of the cholera spirillum is introduced into the peritoneal cavity of a guinea-pig, which, by successive inoculations, has been rendered highly immune to virulent cholera spirilla, or a like dose of the spirillum, mixed with an excess of the cholera immune serum from a guinea-pig, is injected into a normal guinea-pig. In either case, by removing with a pipette some of the

peritoneal fluid from time to time, it is seen that the injected bacteria become motionless, swollen and rounded, resembling micrococci and then become progressively smaller, their substance undergoing solution, as Pfeiffer described it, like sugar in water. This same process has been observed in the bacilli of anthrax, typhoid and pneumonia and in streptococcus pyogenes. The following are some of the most interesting and important facts that have been established regarding bacteriolysis.

1. It is brought about by the interaction of amboceptors and complements upon the bacterial body.

2. Antibodies, including both amboceptors and complements, may be found in the blood of normal animals, but the amount of amboceptors is small compared to what may be developed by specific inoculation.

3. The amboceptors are multiple—viz., an animal immunized against both cholera and typhoid provides a serum which, after destroying the cholera spirilla, will, when added to typhoid bacilli suspended in normal serum, destroy these also.

4. By immunization of animals against a specific microbe specific immune bodies are developed, acting particularly upon the species of micro-organism employed for inoculation.

5. It is possible to develop temporarily non-specific protective powers on the part of the organism. Such increased resistance against pathogenic bacteria in general may be developed at the height of inflammation and it is doubtless associated with increased leukocytic activity.

6. The antibacterial amboceptors as a class are unaffected by heating for several hours to 60 C., but are destroyed at 70.

7. They are not immediately produced upon inoculating animals with bacteria; usually several days elapse before they are recognizable in the blood.

8. Once developed by the organism, they are to be recognized in the blood serum for a considerable period, varying with the different species but extending in some cases to a year or more.

9. If they disappear from the blood serum a relatively very slight inoculation of the specific micro-organism will result in their abundant reappearance.

10. They may be developed either by progressive inoculations of the living microbes, by larger doses of the dead microbes, or by a combination of the two methods. Such inoculations, as shown by Haffkine, Wright and others, may be employed to produce immunity in man against cholera, plague, typhoid, streptococcus and some other infections.

More might be added, but time will not permit. In closing I will speak of a peculiar phenomenon known as diversion of the complement. If a suspension of bacteria be taken in a normal serum containing sufficient complement to cause bacteriolysis when a known amount of inactivated immune serum is added—i. e., containing a certain quantity of amboceptors—and if inactivated serum containing several times this quantity of amboceptors be added, bacteriolysis, instead of being hastened, is slowed and may be wholly arrested. Several explanations are given for this strange occurrence, but Adami gives the clearest and simplest. He says there is evidently a diversion of comple-

ments—i. e., the unattached amboceptors, which are in excess, have a greater avidity or attraction for the complements than those amboceptors have which have become partially satisfied by attachment to the bacteria or conversely; it may be true that the bacterial receptors have a greater attraction for the uncombined amboceptors, which are in excess, than for the combined amboceptors and complements.

In conclusion, from the practical point of view, that of establishing passive immunity by inoculating immune serum, it is important to know that there is variation in the amount of complements in the individual and that they may undergo reduction in the course of disease and also that the complements in the blood of one animal do not necessarily correspond with those of another and are not so active in the blood of that other animal as are the complements which belong there. Therefore, passive immunity and the destruction of bacteria are not always complete. Mixed immune sera are, therefore, sometimes found more satisfactory than the immune serum of a single animal or species; or, it might be suggested that normal human serum is most likely to afford the right order of complements for human patients, a relatively small amount of serum containing, it is found, sufficient complement to satisfy a large bulk of amboceptors.

In my next paper I will try to review the rest of this difficult but important field of science.

SHEET OF DIRECTIONS GIVEN THE PATIENT AFTER A TONSIL OPERATION, INCLUDING THE TREATMENT OF POSTOPERATIVE HEMORRHAGE.*

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Having recently read a paper on the "Treatment of Postoperative Nasal Hemorrhage" at a meeting of the South Branch of the Chicago Medical Society, which was well received, and having just revised my "Sheet of Directions to Patients After a Tonsil Operation," I take the privilege of presenting the same, chiefly owing to the consideration given therein to the treatment of postoperative hemorrhage.

Any persistent or profuse hemorrhage following a tonsil operation is an annoyance to both the operator and patient and may, if not promptly and properly treated, even prove dangerous. The old adage which deals with the truism that "a stitch in time saves nine" applies nowhere more appropriately than in the treatment of tonsillar hemorrhage, for, while in most cases it can be quickly controlled by prompt and efficient treatment, it may otherwise continue, or intermittingly recur, much to the patient's discomfort.

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* Read at meeting of the Chicago Laryngological and Otological Society, March 9, 1909.

A hemorrhage from the throat or nose generally unnerves the patient more than the loss of an equivalent amount of blood from some other location. Furthermore, owing to free salivation, nausea and even vomiting often thereby induced, the amount of blood lost seems to be greater than it really is.

In order to meet emergencies arising in practice, I have for several years followed the custom of giving the patient from time to time printed sheets of instructions to insure the following of directions and to provide for complications which may occur. In no place is such a sheet of directions of more value than after a tonsil operation as a guide to both diet and treatment, and particularly in order to meet the possible occurrence of postoperative hemorrhage at any time within about eight days following the operation. I herewith append a copy of this particular sheet of directions:

DIRECTIONS TO THE PATIENT AFTER A TONSIL OPERATION.

For the first two or three days avoid all violent exercise or sudden motion. In going up stairs the ascent should be made slowly. Use the voice in moderation and do not attempt to sing or to speak too loud. In order to *avoid stooping* the use of the sniffing medicine may be omitted for the first twenty-four hours after the operation.

During the First Night After the Operation the patient should sleep with the head well elevated by using several pillows or else by putting an inverted chair under the bolster and pillows, the legs of the chair being against the head of the bed, with the back of the chair sloping on a downward incline towards the middle of the bed. A still better way is to rest for the first night in a reclining chair. A large rocking chair, tilted well back, and held in this position by placing a small box or even a bureau drawer under the forward end of the rockers, will also serve admirably. If possible so to do, it is better to avoid sleep for the first night and pass the time by reading an entertaining story.

Use the Soda Gargle every fifteen (15) minutes while awake. It is made by adding a teaspoonful of Merck's bicarbonate of soda to a glass of water, or, what is still better and more agreeable, add the teaspoonful of soda to a 25 per cent. solution of some one of the pleasant vegetable antiseptics, which means one-fourth (¼) glass of the antiseptic selected and three-fourths (¾) glass of water. In place of the soda gargle, some have preferred a weak solution of green castile soap. Sozodont, well diluted, might also be suggested.

As the wound is deep after any operation whereby the tonsil is thoroughly removed, and as such deep wound is often not well cleansed by gargling, there is advised additionally the hourly use of a suitable syringe whereby the wound may be well cleansed with the same solution (the soda gargle). The best form of syringe to employ is a hard rubber one-half ounce postnasal syringe, the several openings of which insure efficiency. By having a mirror in a window, or by a gas jet, the wound can be easily seen, particularly if the tongue is held down with the handle of a tablespoon so the patient can direct the stream with sufficient force

into the wound. In addition to the hourly use of the syringe, the gargle should be used between times every fifteen minutes as directed for the first day or two, and less frequently thereafter during the remainder of the first week.

If the Iron Medicine is prescribed it should be taken as directed immediately after having used the soda gargle. The dose is one-half (½) teaspoonful to be introduced in the back part of the mouth, avoiding the teeth, and swallowed slowly. Immediately thereafter rinse the forward part of the mouth and the teeth with the soda gargle. Repeat the dose every two hours for two or three days, say at 2, 4, 6, 8, 10 and 12 o'clock. After this use less frequently, say every three or four hours, as directed. Caution. The iron medicine is not to be taken until the day following the operation.

Should there be pain in the ear apply dry heat, which is best done by the use of a Japanese hot-box. After the "feu" is lighted and placed in the box it should be wrapped loosely in a porous cloth, as fly netting or cheese cloth, and tied with tapes over the painful ear. The heat will continue ceaselessly for four or five hours, particularly if two or three "feus" are employed, and the patient can meantime be sleeping. In lieu of the hot-box either a hot water bag, a hot plate wrapped in a towel, or a heated bag of hops, sand or salt may be used. Should either of the latter be selected a pair will be required so one can be in the oven heating while the other is being applied.

A wet pack worn about the neck at night and when in the house will often assist in diminishing the soreness. The pack is made by loosely wringing a towel after having been dipped in ice-cold water. It should then be so folded that it will be about three inches in width and long enough to reach twice about the neck. After applying cover it with a strip of flannel, a dry towel, or, still better, with a strip of thin rubber cloth, as dentist's rubber dam, or oil silk, in order to retain the moisture. When the wet towel becomes warm wring out afresh in cold water and reapply as before, repeating every half hour. In place of the wet pack, if preferred, a bag of heated hops applied about the neck will prove soothing.

Inhaling steam from the spout of a tea-kettle, or from a steam atomizer, three or four times a day, when convenient so to do, will also tend to allay the soreness of the throat.

If constipation occurs take a tablespoonful of epsom salts in water, or else a bottle of the effervescing solution of the citrate of magnesia made ice cold.

After the first week, in place of the soda gargle, use a weak solution of the chlorate of potash, made by dissolving a teaspoonful of the crystals in a glass of water, and gargle with same every half hour or hour. If too strong add more water. Another good gargle is made by adding 10 drops of the tincture of myrrh to two tablespoonfuls of water.

Abstain from all alcoholic drinks, tobacco and highly spiced or hot foods.

For the first day or two after the operation depend chiefly upon milk and cream taken ice cold. If drawn through a straw or glass tube the swallowing will be easier. Ice cream is also recommended. Malted milk (taken in accordance with the printed directions upon the container) will be found to be a most excellent food. Kumyss or matzoon might also be suggested.

After the first day or two oatmeal in cream, cornmeal mush, cold soups, bread and milk, milk toast, raw or soft boiled eggs, tapioca pudding, corn starch and cup custard may be eaten. Raw oysters, when in season, may be taken, the smaller size as blue points being preferable, each oyster being cut in two or three pieces, which can be easily swallowed. Ralston health food deserves particular mention as a food easily eaten and highly nutritious. The same may be said of currant jelly. Usually by the fifth day, and sometimes earlier, the throat has sufficiently improved to permit of indulgence in a more liberal diet, though solid foods had better not be taken until after the first week. By the eighth or ninth day the throat will have sufficiently healed so anything can be eaten as usual.

During the first few days, while the throat is sore, it may be found to be easier to swallow if the tongue is pressed firmly against the front teeth of the upper jaw, while the head is thrown well back. Sometimes better results are attained by pressing the tongue against the lower front teeth and taking liquid from a spoon introduced well back in the mouth, the head, meantime, being tipped backward as before.

HEMORRHAGE.

In case of bleeding after operation, discontinue regular medicines until bleeding is controlled, and gargle continuously with very cold ice water, made by adding a little water to a glassful of pounded ice. To this may be added either a little lemon juice or vinegar, or, still better, a teaspoonful of powdered alum. A small piece of ice held in the back part of the mouth is often of value. The same may be said of an ice bag applied about the neck. Ice used as suggested will generally prove efficient. Should the ice gargle not control the bleeding, then take this paper to the nearest druggist and have compounded the following prescription:

℞. Acid Gallic 3i
Acid Tannic 3iii
M. et ft pulv.

Directions: Put a tablespoonful of the powder in a glass and add a tablespoonful of water, stirring until mixed. Dose, one-half teaspoonful swallowed slowly and repeated every one or two minutes. A little of this mixture may also be added to the alum gargle, which should be used during the intervals between the doses of the gallo-tannic acid mixture. If, after this, the bleeding should still continue, call in a near-by physician and give him this sheet of directions. In such case I would respectfully make the following suggestions:

Hemorrhage after a tonsil operation is most likely to occur within the first six or twelve hours after operation, and when local anesthesia has been employed is owing to paralysis of the muscular coat of the bleeding vessels so they can not contract as they normally would. This paralysis is due to the after effect of the cocain. The hemorrhage will generally be found to be capillary and to be from the entire surface of the wound.

Fainting generally causes a cessation of hemorrhage; therefore the patient should be kept standing with head erect and meantime instructed to take long and deep breaths. If, furthermore, the arms are elevated above the head the blood pressure is diminished. As this position becomes tiresome the clasped hands may be held upon the head. See that the neck is not constricted—a tight collar, for example, should be removed. Ergotole used hypodermically is of great value.

℞. Ergotole (S. & D.) ..... ℥ii

S. Inject hypodermically minims xx, repeating same dose in fifteen minutes, and even again in another fifteen minutes if required. Three doses are usually sufficient so the desired effect is produced, or toxic symptoms manifested, as syncope and nausea, which depress the heart's action and, as above stated, tend to control the hemorrhage. *Aseptic ergot* may be used in the same manner.

One hypodermic of morphin, preferably a maximum dose, is to be particularly recommended in lieu of the ergotole in case the latter is not at hand. Norwood's tincture veratrum viride, administered hypodermically (say 5 or 10 minims), has been employed successfully, it being like morphin a cardiac depressant and, furthermore, causes nausea. The relaxation from vomiting will often prove effective. With this object the hypodermic administration of 1/10 grain of apomorphin has been employed. Bosworth recommends an emetic of zinci sulphas. As cardiac depressants and relaxing agents are chiefly indicated, it becomes apparent that alcohol in any form is to be avoided, as are also hypodermics of strychnia, atropia, etc.

Astringents applied directly to the bleeding area are often effective. The wound should be packed with gauze medicated with the astringent selected. For patent reasons one end of the gauze should be secured outside of the mouth. The following astringents might be suggested.

A. A paste made by adding powdered tannin to a 20 per cent. solution of antipyrin.

B. Powdered permanganate of potash made in a paste by the addition of 4 per cent. of vaselin.

C. ℞. Tr. benzoin comp., ℥i; iodoform, ℥i. M.

D. Styptic collodion, which is a combination of collodion, alcohol and tannin.

E. Turpentine.

Adrenalin 1-1000 would naturally occur to one as a proper agent to employ. In my experience it has proven more efficient in preventing hemorrhage than in stopping it after it has begun. In its use there is also the danger of recurrence owing to its secondary effect. If employed

at all it should be used, as are the other astringents, by packing the wound with gauze saturated therewith, in which case due credit must be given to the gauze packing, as tonsillar hemorrhages are often controlled by simply packing the wound with unmedicated gauze.

Monsel's solution is not to be recommended for different reasons. As usually employed, by applying it to the wound with a swab, a coating is formed, under which the hemorrhage continues, the blood meantime being swallowed. Furthermore, after its use, the wound heals more slowly, hence my preference is for other methods of treatment. It may, however, be effective if gauze moistened therewith is tightly packed into the wound, though, as before stated, due credit must be given to the packing of gauze regardless of the astringent employed. If for any reason iron is used it must not be applied while there is present any tannin or an inky precipitate will form. The value of ferropyrin has been highly extolled. It is a dry powder, consisting of equal parts of the chlorid of iron and antipyrin. It is applied to the bleeding area upon gauze, and in case of tonsillar hemorrhage would be packed into the wound. Owing to previously mentioned statements other methods of treatment are to be preferred.

Peroxid of hydrogen is another agent of use for the control of hemorrhage, though it is of but little value in tonsillar hemorrhage. If used as a gargle an immense amount of froth is produced, under which the bleeding continues, and the froth may prove a danger if aspirated in the lungs. The only advisable method of use would be to pack the wound with gauze moistened therewith, in which case the unmedicated gauze would prove nearly, if not quite, as effective.

The hot water douche, which is so efficient in controlling surgical hemorrhage generally, might be employed. In such case no good can be expected unless the water is absolutely as hot as can be borne (about 130° Fahr.), and the stream must be intermittingly applied directly in the wound by means of a fountain syringe with a long tube, as a metal catheter, the patient meantime holding the breath and leaning well forward. Having the water acidulated with vinegar would probably increase its efficiency. On the whole, it is not to be recommended in the treatment of tonsillar hemorrhage, and is only mentioned as a substitute for other treatment in emergency should there not be available other agents required.

A strong solution of nitrate of silver, say, 20 or 25 per cent., is one of the best applications for the *prevention* of hemorrhage after a "cautery dissection" operation by coagulating the albuminous element of the tissue and thus forming a dense coating, but, *after* a hemorrhage has begun the exuding blood dilutes it and washes it away so as to prevent its acting as it does when applied to a bloodless wound. It, furthermore, finds its way to the larynx and is thus distressing to the patient.

Continuous pressure, efficiently applied, will probably control any secondary tonsillar hemorrhage to be met with, and is the most practical and surgical method of treating hemorrhage of this kind. This can be done with the thumb, it first being wrapped with gauze. There

are special instruments devised for this purpose (Fig. 1), though any instrument shaped like a placental forceps, or even a small pair of tongs, can be substituted, both points being wrapped with gauze or muslin, and continuous pressure made therewith. Strong pressure applied externally with the thumb on the carotid might also be tried.

Should it be possible by inspection to recognize a bleeding vessel it should be grasped with an artery forceps and tortion applied, though, as before stated, bleeding from a tonsil wound is most often of an oozing

Fig. 1.—Writer's tonsil presser (½ size).

character and seems to come from the entire surface of the wound. As continuous pressure applied by the hand becomes tiresome to the physician and very annoying to the patient, it is better to employ, if available, a tonsil hemostat, one form being shown in Fig. 2.

In any case where there has been a considerable loss of blood certain methods of systemic treatment should be employed.

Bandaging each limb near the trunk will diminish the amount of blood in circulation. If this is done one bandage at a time should be released, so the circulation of the limb will not be too long obstructed. In this way three limbs can be kept distended with blood.

Fig. 2.—Writer's Tonsil Hemostat (½ size).

Chlorid of calcium given by mouth or rectum in doses of ten grains, dissolved in two ounces of water and repeated hourly for three doses, has been employed with benefit in case of persistent and oozing hemorrhage. After the third dose it should be discontinued for a few hours before being again used. Forty to 60 grains in 24 hours is regarded as the maximum dose as an anti-hemorrhagic. The lactate of calcium has also been advised, a single dose of 30 grains in water being given.

Hypodermatoclysis. Should the hemorrhage have been very severe it is advisable to administer a subcutaneous injection of normal saline fluid into the cellular tissue at the most favorable point, or else, as an alternate, a full enema (½ gallon or more) of the same fluid may be employed.

103 State Street.

EARLY IMMUNIZATION, THE ESSENTIAL FUNCTION OF THE TONSIL.*

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One of the greatest problems under consideration at the present time by workers along the lines of scientific physiology, pathology and therapeutics is that of immunity, and I purpose in this paper to show the part the tonsil takes in establishing this condition.

As late as 1907 one of the leading men in the profession, George Bacon Wood, states that "the real reason for the existence of the tonsil has not yet been explained." The tonsil is so located that it is exposed to bacteria coming to it by way of the nose, mouth, lungs and stomach. Every mouthful of food loaded with microorganisms is rushed by the tonsil in the act of swallowing. The secretions from the nose are carried toward the tonsillar crypts by the cilia, as demonstrated by Jonathan Wright. The secretions from the lungs are coughed or carried by the cilia directly toward the tonsils. So in the act of vomiting, which is frequent in infants, the contents of the stomach are brought directly in contact with the tonsils. From these facts one is led to believe that the tonsil must have an important function or else it would not be placed where it is exposed to infection.

The tonsil in the embryo does not develop until the fourth or fifth month, so that we may conclude, first, that, whatever be the function of the tonsil, it has not functionated prior to this period, and, second, that it can not have a vital embryonal function or else it would develop earlier in fetal life. At birth the tonsil is fully developed, having matured histological structures and therefore able to perform its function. That the tonsil functionates early in life is suggested, first, by the fact that when tonsils are enucleated after about three years of age the system knows no loss; second, the tonsil, like adenoids, in healthy children who have had no attacks of tonsillitis, has a tendency to atrophy or decrease in size from the third or fourth year to puberty.

Many theoretical functions have been ascribed to the tonsil. Spicer thought it eliminated certain elements from the system, which, however, proved to be false by chemical analysis of the contents of the crypt.

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* Read before the Chicago Laryngological Society, March 9, 1909.

* Dr. Orndorff, who is associated with me in this work, read a paper before the Porter Medical Society, Dec. 3, 1907, entitled Prophylaxis the Essential Function of the Tonsil.

Massini advanced the theory that the tonsil furnished an internal secretion like that of the ductless glands. None of the histological tissues in the tonsil could produce secretions like those found in the ductless glands. Fox considered the tonsil as having the property of absorbing salivary digestion. Gulland gave the tonsil a bactericidal function—namely, that of destroying bacteria which enter the alimentary tract by way of the mouth. The only material in the crypts having this power is the salivary corpuscle, and we know that the great number of bacteria entering the system by way of the mouth are many times more than could possibly be destroyed by the salivary corpuscles. Furthermore, nearly all bacteria, when entering the stomach, lose their pathogenic potency.

George Bacon Wood has very elaborate drawings with which he attempts to show that the stratified epithelial cells at the bottom of the crypts are transformed into leucocytes and considers the tonsil primogenial source of leucocytes. This would overthrow all of our views that the leucocytes have their origin from the original mesoblastic elements.

Notwithstanding the hopeless foundation for the above mentioned theories, there are some facts which have been demonstrated that serve as a basis for logical conclusions. For example, Goodale noted, first, that salivary corpuscles possessed phagocytic properties; second, that the lymph currents promoted by the ciliated epithelium of the oronasal cavities converge toward the region of the tonsil; third, that this lymph passes into the cervical lymphatics through the tonsils. Wright noted that foreign particles, such as carmine granules, oil globules, etc., pass with the lymph current through the cryptal epithelium into the tonsil and that living bacteria remain in the crypts. With these established facts in mind we are in a position to understand clearly the function of immunity performed by the tonsil.

Immunity may be defined as that which prevents the gaining of a foothold by disease germs into the body, or that which neutralizes their harmful products or destroys the organisms. However, immunity is only relative, and whether an individual suffering from the disease after the germs have been introduced into his system depends on two factors—the pathogenic potency of the germs and the vital resistance of the individual. For example, a fowl, under ordinary conditions or normal conditions, is immune to inoculations under the germs of tetanus, yet if the chicken be compelled to remain in a refrigerator and stand on a piece of ice for a time, it becomes susceptible to inoculations of tetanus and dies. An organism may possess an inherent immunity, as in the case of the fowl to tetanus or man to certain diseases affecting animals. This form of immunity is theoretically interesting but practically valueless.

It is the acquired immunities which are of interest to us in the functions of the tonsils. There are two forms, natural acquired immunity and artificially acquired immunity. Natural acquired immunity is immunity established by the natural forces of the tissues of the body when disease organisms exist for a time within the individual, giving their

products to its system. This is exemplified in such diseases as tonsillitis, diphtheria, measles, etc. Artificially acquired immunity or artificial immunity is induced by the inoculation with live germs causing the disease, or by the injection of the products of the organism. This product may be found in fluid media after extraction from the bacterial body, or it may be inherent to the bacterial body, in which case the organisms are thoroughly sterilized before injection. Any material used to induce this immunity by inoculation or injection may be known as vaccine. A *vaccine* may be defined as any substance of bacterial origin which, when taken into the body fluids, is capable of inciting an elaboration of protective substances. Protective substances or antibodies are certain specific substances with antagonistic properties in the body fluids which aid the bodily resistance by one of two forces or both—mechanical, as phagocytosis, or opsonic power and chemico-physiological, as agglutination and bacteriolysis. All these powers may be present in the resistive manifestations in equal or varying degrees, or one or more may be totally absent.

Agglutination is the process brought about by the union of the bacterial product known as *agglutinogen* with the substance normally present in the body known as *agglutinin*, and is manifested by the power of causing evenly distributed bacteria to clump together—in other words, become paralyzed, as is the case in typhoid fever.

Bacteriolysis is the process by which the resistive elements of the tissue brings about a disintegration or lysis of the bacteria.

Opsonic power is the ability the fluids of the body possess in preparing pyogenic bacteria for the process of phagocytosis.

Phagocytosis consists of the destruction of bacteria by a phagocyte, subsequent to preparation of the bacteria by the opsonins.

A *phagocyte* is any cell which has the power to take within itself a foreign substance and destroy it. It may destroy the substance (bacteria) by a sort of digestive process, or it may, after taking within itself a large amount of foreign material, give itself to the excretory tracts, and thus destroy the substance and itself.

Opsonins are substances distributed throughout the body fluids and are produced as a result of a reaction on the part of the fixed tissue cells to irritation from bacterial substances. They alter the resistance of or prepare the bacteria so that the phagocytes have the power to ingest them.

Artificially acquired immunity may be established in two ways:

1. By injecting bacteria or their products into an individual whose fixed tissue cells will respond with the formation of protective substances or antibodies. These protective substances aid the bodily resistance by neutralizing the bacterial products or by destroying the bacteria themselves. These protective substances may remain potential for months or years, thus rendering a temporary if not permanent immunity. When immunity is secured in this manner by the sole activity of the cells of the individual affected it is termed *active immunity*.

2. If the serum of actively immunized animal be obtained and injected with its protective substances into a second animal an immunity is established without the cellular activity necessary in active immunization. This process is termed *passive immunity.*

If the serum used in the production of passive immunity only contains the property of neutralizing the toxic products of the infecting bacteria it is known as *antitoxic passive immunity.* It will be observed that the bacteria against which an antitoxic immunity may be established give off their poisonous substances while alive. The immune sera so produced is known as *antitoxic serum,* and is represented by such serums as antidiphtheritic, tetanic, and the antitoxic serums of botulism. It is also observed that some bacteria give off a toxin after they are killed and are undergoing disintegration. A serum introduced in passive immunity which destroys the organisms is known as an *antimicrobic serum.* This explains the toxemia following the introduction of antimicrobic serums. Almost all serums on the market are antimicrobic,

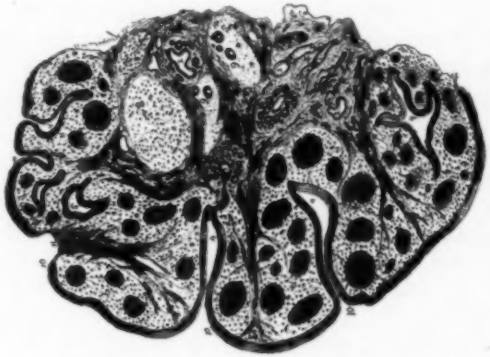

Fig. 1.—1, peritonsillar mucous glands; 2, ducts of mucous glands opening into crypts; 3, stomata; 4, crypts; 5, lymph follicles; 6, interfollicular tissue containing lymphocytes and polymorphonuclear leucocytes; 7, connective tissue; 8, diseased lymph follicles; 9, diseased peritonsillar gland; 10, epithelium; 11, diseased epithelium.

except those mentioned above. All immunities, except inherent immunity, may be produced through tonsil by any of the processes above described. Natural acquired immunity is brought about by acute inflammatory processes in the tonsil. Artificially acquired immunity is produced by the process of bacteriolysis, agglutination or opsonic power in the crypts of the tonsils.

The location of the tonsil is such that the bacteria entering the oro nasal cavity, from the day of birth, are directed toward the tonsillar crypts. The crypts are lined with stratified epithelium (not columnar) so that they are simply receptacles or culture tubes in which bacteria of every variety entering the fauces may be cultivated. The mucus in the crypts serves as the culture medium. The bacteria remains in the crypts, not because the cryptic epithelium has a special selective power, as claimed by Wright, but because, being living organisms, they select the

mucus in the crypts in preference to going along with the lymph current underneath the epithelium, as is the case with dust particles. The glands which furnish this culture mucous in the crypts are located just outside the tonsillar structure. (Fig. 1.)

Dr. Orndoff has named these glands peritonsillar mucous glands. The glands are compound racemose mucous glands situated around the tonsil in the region of the capsule and its trabeculæ. They are found in all tonsils enucleated and they are most numerous at the base of the tonsil near the bottom of the crypts. These glands have ducts which empty into the crypts. This explains how peritonsillar abscesses at times follows follicular tonsillitis. The bacteria multiplying in the crypts give off products called vaccines, which are taken into the tonsil by the lymph current and thence into the entire system, where they come in contact with the fixed tissue cells, which in turn have the power of producing antibodies, such as opsonins, agglutinins, etc., which, as described above, produce immunity.

We must now describe how the bacteria are removed from the crypts after they have fulfilled their part of immunization. There is neither fight or affinity between the salivary corpuscles and any particular bacteria so long as the body is not immunized against these bacteria. To illustrate, pyogenic bacteria entering a crypt of an infant just born will thrive there unmolested by leucocytes until its vaccines, absorbed into the system, cause the tissue cells to produce opsonins, which come into the crypts with the lymph and prepare the pyogenic bacteria for phagocytosis. The salivary corpuscles now grab the bacteria and together they are forced out into the oral cavity in the act of swallowing. This process of leaving bacteria in the crypts just long enough to establish immunity and then be carried out by phagocytes produces what has been termed by Dr. Orndoff "tonsillar equilibrium." In the act of deglutition the superior constrictor muscles compress the peritonsillar glands and force the mucus into the crypts, and this same force or pressure forces the contents of the crypts into the oral cavity. The tonsil with its crypts makes it possible for the system to gradually absorb the vaccines from the crypts and thus produce immunity without systemic toxemia such as we have with acute infections.

The interfollicular tissue is composed of interlacing stellate connective tissue cells, whose spaces are filled with lymphocytes and polynuclear leukocytes; thus a tissue is arranged which offers every protection to the general lymphatic system from the insoluble particles (foreign bodies) which pass through the cryptal epithelium. We will thus see that the real physiological phenomena found by Goodale, Wood, Wright and others are all required in the process of immunization as brought about through the tonsil.

If the body needs to be immunized to ward off or prevent the invasion of bacteria it stands to reason that the time when this function is mostly needed is when the infant is first exposed to these bacteria. That the child of one year of age is not thoroughly immunized as yet is indicated by the fact that the fatality of infants attacked with pneumonia.

diphtheria, scarlet fever, etc., is much higher than later in life. Though the normal tonsil probably functionates until puberty or later, we are nevertheless forced to believe that the time when it is mostly needed is immediately after birth, up to the third or fourth year. That the tonsils are not absolutely needed after this period is shown by the fact that when they are enucleated the system knows no appreciable loss. That the remainder of Waldyer's lymphatic ring may take up this function of the tonsil is quite probable, in other words, that the function of Waldyer's lymphatic ring is probably that of early immunization.

The practical conclusions are, first, that in children under two or three years of age the tonsil, when removed, should not be completely taken out; second, that only diseased tonsils should be enucleated, and, third, when a tonsil has become pathological its function is altered so as to make it possible to become a portal for systemic infection.

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COMPARATIVE RESULTS IN THE TREATMENT OF GONORRHEA IN YOUNG GIRLS.*

[From the Laboratory of Dr. L. L. McArthur and Dr. John C. Hollister.]

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For the study of the comparative value of vaccine, serum and general hospital or local treatment we have had under our observation during the last thirteen months 65 cases of chronic gonorrhea in young girls, of ages ranging from 12 to 18 years. Forty of these patients have been observed for one year; the remaining thirty have been added during the year. We have divided them into 6 classes, according to treatment, endeavoring to keep 10 in each class. Twenty-two cases, before coming under our observation, had received previous treatment for from 2 months to 2 years, and we have endeavored to place an equal number of these previously treated cases in each of the 6 classes mentioned. The cases were also classified according to pelvic findings and as nearly similar cases as possible placed in each group.

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* Read before the Chicago Medical Society, March 24, 1909.

Class 1 includes those patients receiving gonococcus vaccine only.

Class 2 received the gonococcus vaccine plus local treatment twice a week, which consisted in thoroughly wiping away with dry cotton all secretions from the cervix and vaginal vault and then swabbing these parts with pure ichthyol.

Class 3 received the ichthyol treatment alone.

Class 4 were treated once daily with a low pressure normal salt douche, and once a day the discharge was thoroughly swabbed from the vaginal vault and cervical os with normal salt sponges.

Class 5 received antigonococcus serum alone.

Class 6 were swabbed vaginally twice a week with a 4 per cent. silver nitrate solution and the urethritis cases received injections of 2 per cent. argyrol as the case demanded.

In every case in the six groups the external genitals were washed three times a day with normal salt. In classes 1 and 2 we used a stock vaccine prepared in the laboratory of Drs. McArthur and Hollister. The uniform dosage of 25 million was administered once a week. In class 5 each patient received three times a week one cubic centimeter of antigonococcus serum, very kindly furnished us by the Experimental Department of Parke, Davis & Co. The vaccine has shown an occasional slight local reaction. The serum has several times given a rather severe local reaction which cleared up in two or three days. We have observed no general reaction in any case.

Each patient has had a pelvic examination every three to six weeks, with occasional exceptions, due to age, menstrual period, etc. Each of these examinations has been made by two and sometimes three observers —namely, Dr. Hollister, Dr. Lincoln, Dr. Wieland and myself. At each examination smears were made from four regions, the vulva, vaginal vault, cervix and urethra. Gonococci were identified microscopically in the smears from every patient. In many of the smears the gonococcus was the predominating or sole organism. In many others the luxuriant flora made an hour's study not infrequently necessary to find a few leucocytes packed with typical, bean shaped, Gram negative diplococci.

It is our purpose to present to you here comparative results in the treatment of the six classes described. The findings in all the cases of the six groups have been tabulated in detail and per cents. calculated in order to answer the following questions:

1. What group shows the greatest per cent. of cases in which the gonococci disappear?

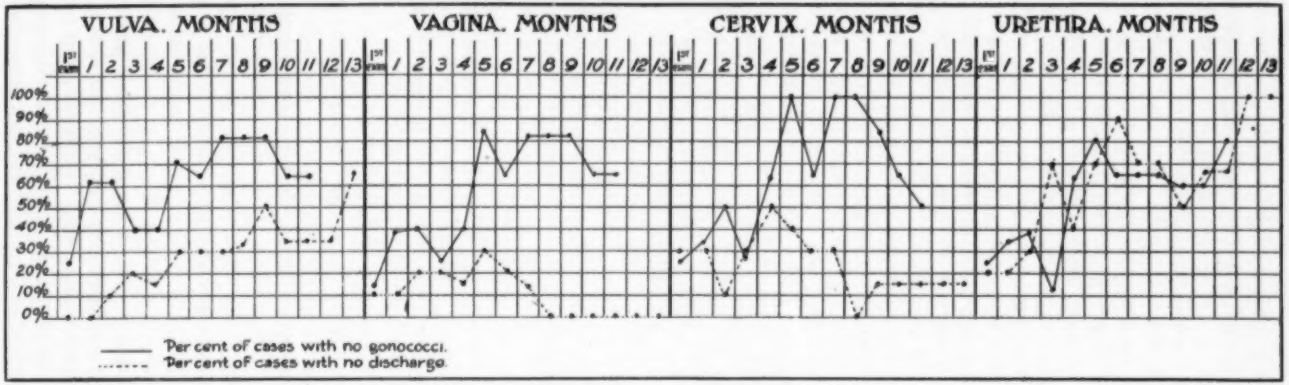
2. What group shows the largest per cent. of cases in which the discharge disappears?

3. What region—vulva, vaginal vault, cervix, urethra—was most frequently involved when first examined, and from which part do the gonococci first disappear?

4. What region—vulva, vagina, cervix, urethra—had the greatest discharge when first examined, and from which of these regions does the discharge first disappear?

GROUP I. TREATED WITH GONOCOCCUS VACCINE

CURVES SHOWING THE COMPARISON BETWEEN THE PER CENTS. OF CASES WITH NO GONOCOCCI AND PER CENTS. OF CASES WITH NO DISCHARGE



1. Note the great fluctuation in the disappearance of the gonococci in all the regions, and the slight fluctuation in the disappearance of the discharge.
2. Note the large per cent of cases with no gonococci, but with discharge still present
3. Note that the curves of the disappearance of the gonococci and of the discharge run parallel in the case of the urethra.

5. Which group shows the greatest number of cases in which thickened tubes, cervical erosions and pelvic adhesions disappear?

(a) As to the first question: What group shows the greatest per cent. of cases in which the gonococci first disappear?

The gonococci disappear according to the following order of groups:

1. Vaccine.
2. Antigonococcus serum.
3. Vaccine plus ichthyol, and ichthyol alone, rank the same.
4. Normal salt.
5. Silver nitrate.

(b) The disappearance of the discharge in the different classes does not run parallel with the disappearance of the gonococci in the same class. The discharge clears up according to the following order of groups

1. Ichthyol.
2. Antigonococcus serum.
3. Vaccine.
4. Vaccine plus ichthyol.
5. Normal salt.
6. Silver nitrate.

The relation between the clearing up of the gonococci and the clearing up of the discharge is a fluctuating one in each class. We have made charts to illustrate this relation.

Note the vaccine class as an example. There is a comparatively slight fluctuation in the curve which graphically portrays the presence or absence of the discharge from month to month. On the other hand, the curve showing the disappearance of the gonococci is very fluctuating; at one examination these diplococci have disappeared, at another they have reappeared. These two curves representing the disappearance of gonococci and the discharge show a more parallel relation to each other in portraying the findings in the vulva and urethra than in the vaginal vault and the cervix. In the urethra the discharge and the gonococci disappear almost simultaneously. This is approximately true in the vulvar region, while the findings in the vaginal and cervical regions are very different. For example, at the end of the eight month 100 per cent. showed a thick, glairy discharge coming from the cervix and in not one of these cases were gonococci demonstrable in the smears at that time. In the following month 85 per cent. showed a cervical discharge, while in only 15 per cent. of these cases were gonococci found. We would like to add here that in a considerable number of cases where the vulva and urethra were perfectly clean, both as to discharge and gonococci, gonococci were found in smears from the cervix.

(c) Now, as to the third question, what region—vulva, vagina, cervix, urethra—was most frequently involved when first examined, and from which part do the gonococci first disappear? Our tables give us the following findings:

When first examined the region showing gonococci in the greatest per cent. of cases was: First, the vulva; second, the cervix; third, the

urethra, and last, the vagina. Of how much value then is a vaginal smear in the diagnosis of gonorrhea? The order in which the gonococci cleared up was: First, in the vagina; second, vulva; third, urethra; fourth, cervix; the cervix showing a considerably greater chronicity.

(d) The region showing mostly frequently the presence of a discharge on first examination and the order of disappearance is almost opposite to the finding of gonococci. Of how much value, then, is the presence of a discharge in the diagnosis of gonorrhea? The order of regions most frequently showing a discharge was as follows: First, vagina; second, vulva; third, urethra; fourth, cervix; while the order in which they cleared up was: First, urethra; second, vulva; third, cervix, fourth, vagina.

(e) Lastly, which group shows the greatest number of cases in which thickened tubes, cervical erosions, and pelvic adhesions disappear? Such findings would be of greater value at the end of two or three years than at the end of one year. At the present date the order of improvement is as follows: The groups showing the greatest improvement in cases of salpingitis are: First, vaccine plus ichthyol local treatment; second, vaccine; third, serum; fourth, ichthyol; fifth, normal salt; sixth, silver nitrate. Cervical erosions disappear in a greater per cent. of cases treated with vaccine plus ichthyol alone. The serum and the ichthyol alone give an equal percentage of cases showing disappearance of cervical erosions. Pelvic adhesions show greatest improvement in: First, the vaccine plus ichthyol cases; second, serum; third, vaccine alone; fourth, ichthyol alone; fifth, normal salt; sixth, silver nitrate. Therefore the pelvic findings in general show a greater percentage of improvement in the cases treated with the vaccine plus ichthyol. Vaccine alone and serum give approximately equal results. Ichthyol alone comes next in value, while silver nitrate comes last.

CONCLUSIONS.

1. In summarizing the improvement as to the disappearance of gonococci, the clearing up of discharge, and the improvement in pelvic findings the vaccine and serum cases tally in the number of points of value, the vaccine alone and vaccine plus ichthyol give results of approximately equal value, while the silver nitrate cases come last:

2. The advantages of the vaccine are:

(a) The volume of the dosage is very small, only one-fourth of that of the serum; hence there is practically never any local reaction.

(b) The interval between the injections is three times as long as the interval between the injections of the serum.

(c) The preparation of the vaccine is very much simpler than that of the serum. It can be prepared in any well equipped laboratory, while the preparation of the serum necessitates the immunizing of animals. The greater frequency of the dosage of serum and its more difficult preparation make the serum treatment considerably more expensive than that of the vaccine.

3. The examination of smears made from the cervix, when possible, as well as from the vulva, vagina and urethra, is of vital importance in the diagnosis of gonorrhea in many cases.

4. The absence of vulvo-vaginal discharge by no means rules out the diagnosis of gonorrhea.

THE DIAGNOSIS OF SYPHILITIC EYE LESIONS BY MEANS OF THE SPIROCHÆTA PALLIDA AND THE SERUM REACTION OF WASSERMANN.*

B. C. Corbus, M.D.

CHICAGO.

With the demonstration of Metschnikoff and Roux in 1903 that the higher apes could be inoculated with syphilis, it immediately became apparent that here, at last, we had an additional way of studying this universal disease. These observers showed that the chimpanzee was the most easily inoculated and that this susceptibility decreased as one descended in the scale of the monkey kingdom until the ordinary ring-tailed monkey could only be inoculated in certain selected areas, notably the eyebrow, and, further, that the rabbit, dog and sheep could also be inoculated in certain selected areas, but the disease in these animals was not followed by any secondary manifestations.

Stimulated by the work of Metschnikoff, Roux and Siegel, Schaudinn and Hoffmann set to work to discover, if possible, the cause of syphilis, and in 1905 announced to the world the *Spirochæta pallida* as the etiologic factor of syphilis. We are willing to admit that methods of cultivating this organism up to the present time have not been successful, but inoculation and reinoculations have been carried on through 42 consecutive monkeys and, further, the anterior chamber of an eye[2] of a rabbit has been inoculated with the spirochete and from here monkeys have been inoculated and the organisms reclaimed from this source. With these investigations comes an enlightenment in the pathology of syphilis.

The inital lesion, no matter where situated, whether genital or extragenital, represents the first known collection of spirochetes. After a certain period, varying from 2 to 4 weeks, these organisms leave the local focus and advance throughout the host. Systemic invasion has taken place, and the manifestations of the secondary lesions, whether cutaneous or visceral, are all characterized by collections of spirochetes. This is equally true of the tertiary lesions, so we see that the organism itself is directly responsible for the pathological changes. With this knowledge our next most important step is to get rid of this organism

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* Read before the March meeting of the Chicago Ophthalmological Society.

1. Arbeiten aus dem Kaiserlichen Gesundheitsamtes. Band xxii, Heft 2. April 10, 1905.

2. Wien. klin. Wchnschr., No. 24, 1906, page 726.

by commencing treatment before it has invaded the system. With the discovery of the spirochete came its demonstration with the staining method, which at first was more or less successful in skilled hands, but the demand for a simpler and more reliable method led Reichert, the instrument maker of Vienna, to reintroduce the dark ground illuminator. Here we have a method which is extremely simple, the technic of which can be mastered by the average physician.

During the past 18 months we have examined some 200 cases. These have been confined to primary lesions on the penis, hands and lips, and secondary lesions, comprising condylomata, mucous patches, papules and enlarged inguinal glands. In looking over Alfred Fournier's collection of 647 chancres of extragenital origin we find only 7 cases of chancre of the eye lid, or a little over 1 per cent. He adds, however, that chancres of this origin are frequently unrecognized, which may account in a measure for the small per cent. With our present methods of diagnosis it should not be difficult to diagnose these conditions.

Numerous English and American ophthalmologists lay considerable stress on the fact that the spirochetes are found in apparently healthy eyes of fetuses and infants who have died from congenital syphilis. This is not at all surprising when we realize that the fetal circulation is fairly alive with the organisms and that they are easily demonstrated in every organ, particularly in those organs where there is an abundant blood supply, as, for example, the choroid coat of the eye. Zur Nedden[3] demonstrated the *spirochæta pallida* in the aqueous humor of a case of acute syphilitic iritis. Stephenson[4] found the spirochete in the aqueous humor of a woman with secondary syphilis. For obtaining the spirochete in this class of cases these men recommend the puncture of the anterior chamber. In the light of our modern investigations the Wassermann test replaces this procedure. Kowalewski[5] reports a case of an individual who was treated for an inflammation of both eyes. Suddenly he developed an ulcer of the lower left eyelid in which spirochetes were found. This was controlled by the Wassermann reaction, which was positive. Hanford McKee[6] reports the finding of the spirochete in a mucous patch on the palpebral conjunctiva of a woman suffering from secondary lues.

Spirochetes have been found in keratomalacia by numerous observers.[7] Some of these cases were of doubtful syphilitic origin, as spirochetes are found in all cases of gangrene. It is questionable whether these were the *Spirochæta pallida*. From the preceding we would be led to presume that primary and secondary lesions of the eye are extremely rare. This in a measure is true, but it is highly probable that these conditions have been overlooked on account of insufficient means for diagnosis.

3. Ber. d. ophth. Gesellsch., Heidelberg, 1906, page 215.
4. Ophthalmoscope, June 1, 1907, page 303.
5. Klin. Monatsbl. f. Augenh., 1905, Band 11, page 489.
6. Ophth. Rec., Feb. 27, 1909, page 63.
7. Ophthalmoscope, June 1, 1907, page 303.

With the aid of the dark ground illuminator we have a rapid, reliable and simple method of differentiating these ulcers, and as a further means of diagnosing syphilitic eye lesions we have the serum test of Wassermann, Neisser and Bruck.[8] The Wassermann test depends on the discovery of Bordet and Gengou, which is as follows: That bacteria or their extracts will unite with their corresponding antibodies by means of complement and *fix it.*

For the performance of this five factors are necessary. Namely: 1. Antigen. 2. Complement. 3. Antibody. 4. Amboceptor. 5. Red cells.

1. *Antigens.*—Antigens are substances which, when injected into an organism, cause the formation of corresponding antibodies. These are usually prepared from the bacteria themselves. Example—auto-vaccines. On account of our inability to grow the spirochetes we use a 10 per cent. alcoholic extract of the liver of a syphilitic new born.

2. *Complement.*—Complement is present in all sera. What it is we do not definitely know. It is destroyed by heating to 56 degrees centigrade for one-half hour. For convenience it is obtained from guinea-pig blood, either from the heart or by slaughtering the animal. It is not necessary to have this sera sterile. The blood should be collected in glass retainers and the sera pipetted off as soon as the clot is separated. As this is very unstable, it should be put at once on the ice.

3. *Antibody.*—Antibodies are present in all syphilitic sera, provided the disease is still active. This is best obtained by withdrawing under strict aseptic conditions 2 to 5 cubic centimeters of blood from the medium basilic vein, allowing the blood to clot. Pipette off the sera, inactivate ½ hour at 56 degrees centigrade to remove the complement, put on ice until ready to make the test.

4. *Amboceptor.*—Amboceptor is an antibody. It is prepared by injecting into a rabbit the washed red cells (antigen) of freshly defibrinated sheep's blood. This is repeated about every 5 days for several weeks until the rabbit's serum has the power of laking red cells, 2 to 4 c.c. of the red cells being injected each time. When the rabbit has become sensitized sufficiently the animal is either slaughtered or the heart punctured and the blood collected in sterile retainers under strict aseptic conditions. After the clot has separated the serum is pipetted off and inactivated—that means destroying the complement—by heating to 56 degrees centigrade for ½ hour. A stock preparation, if kept sterile, can be kept months.

5. *Red Cells* (Sheep's Blood). This is obtained from the carotid of a sheep (under strict aseptic conditions). This is at once defibrinated, washed two or three times with normal salt solution and mixed in a 5 per cent. suspension with normal salt and put in the refrigerator until ready for use. The next step is to standardize our amboceptor—that is, to find in what dilution a definite amount of amboceptor will lake a given amount of red cells by the addition of a definite amount of complement. This test serves to control both the complement and ambo-

8. Berl. klin. Wchnschr., No. 1, 1907, page 12.

ceptor. Next we standardize the organ extract (antigen). First—Ascertain that the antigen does not prevent or cause hemolysis. Second—The serum of the suspected syphilitic containing (antibodies) should be tested in order to see that the complement is inactivated and the serum, in conjunction with the amboceptor, does not hemolyze red cells. The red cells should always be freshly washed with salt solution, taking great care not to use any that have hemolyzed.

TECHNIC.

Take as many tubes as you have sera to be tested, always adding several known syphilitic and normal sera. Place in each tube about 10 c.c. salt solution. A definite amount of antigen is placed in each tube. Next a definite amount of complement is added and, lastly, the serum to be tested (antibodies) is added. It is best to make duplicate tubes, using the original amount of antigen and complement and twice as much blood serum as in the first tubes. These are shaken well, put into an incubator for 1 hour at 37 degrees C. According to our diagram, the antigen is united to the antibody, being bound by means of complement, provided the patient's serum contains syphilitic antibodies. Next we add a definite amount of amboceptor and red cells. These are in turn briskly shaken and placed in the incubator for another hour.

In the event that there are no syphilitic antibodies present in the patient's serum, the complement deviates and binds amboceptor and red cells and a laking takes place. On the contrary, if the antigen is united to the antibody by means of complement, the red cells will not become hemolyzed, as the complement has all been used up, and the resulting mixture will be turbid—that is, the red cells will remain undissolved. Whether the limitations of this test extend beyond the mere diagnosis and permits us to judge in some degree of the effectiveness of a cure, time alone will tell. The tendency of modern treatment of syphilis is toward a biological treatment—that is, to control the treatment with the Wassermann reaction. Of one thing we are positive—that the Wassermann reaction gives us control of the diagnosis after the period of second incubation, no matter what length of time has elapsed, provided the patient is not cured.

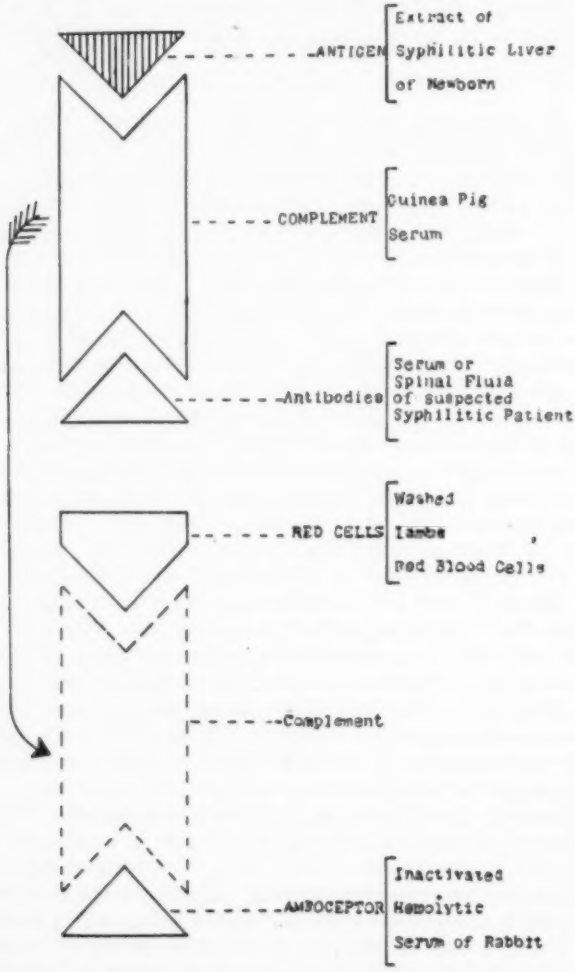
Unfortunately the Wassermann reaction is complicated. It requires time, patience and careful work and each series of tests must be controlled by known, normal and syphilitic sera. Statistics in regard to the value of this reaction are now available in large numbers and there seems to be no branch of medicine or surgery that is not benefited by this discovery. Since its introduction this test has been performed upon thousands of cases and the statistics of the various authors have been practically the same.

Citron[9] reports 156 cases non-syphilitic, all negative; 108 cases syphilitic or suspected syphilitic, 74 per cent. positive.; 43 cases tabes and paresis, 79 per cent. positive.

9. Berl. klin. Wchnschr., No. 43, 1907, page 1370.

Blaschko[10] examined 283 cases, all syphilitic. He divides them into the following:

1. Primary lesion, 63 cases, 90 per cent. positive.
2. Early syphilis with symptoms from first eruption to 4 years, 56 cases, 98 per cent.



3. Early syphilis without symptoms from first eruption to 4 years, 67 cases, 80 per cent.

4. Late syphilis from fourth year on with symptoms, 26 cases, 91 per cent.

10. Berl. klin. Wchnschr., Nov. 14, 1908, page 604.

5. Late syphilis from fourth year on without symptoms, 51 cases, 57 per cent.

6. Cerebro-spinal from fourth year on, 10 cases, 60 per cent.

Wassermann[11] examined 163 cases of syphilis. His classification is as follows:

Chancre	26 cases	17 pos.	68 per cent.
First eruption	42 cases	39 pos.	93 per cent.
Second eruption	42 cases	39 pos.	93 per cent.
Tertiary	16 cases	16 pos.	100 per cent.
Lues of nervous system	8 cases	6 pos.	75 per cent.
Malignant syphilis	4 cases	4 pos.	100 per cent.
Hereditary syphilis	4 cases	3 pos.	75 per cent.
Latent syphilis	36 cases	30 pos.	83 per cent.

Cured, 4 cases; 0 positive, 22, 12, 11, 9 years negative.

During the past year we have made some 200 examinations. Necessarily our cases have been confined to medical and cutaneous diagnosis and our results run parallel with those of the other observers quoted. A few cases of interest are the following:

1. A mother who had given birth to syphilitic child had never shown signs of syphilis and, according to Colles law, was immune to syphilis. Our serum test was positive.

2. Seven cases of syphilis, ranging from 5 to 6 years' duration, gave a negative reaction. These cases had all had good antiluetic treatment.

3. One case of specific ulcer of the septum of the nose gave a positive reaction.

4. One case of Argyll-Robertson pupil gave a positive reaction.

5. One case of optic atrophy gave a positive reaction.

6. One case of interstitial keratitis gave a positive reaction.

Summing up Mühsam's[12] conclusions in regard to the Wassermann reaction in general we have the following:

1. The reaction is specific.

2. A positive reaction shows the presence of active syphilis.

3. A negative reaction does not always show that lues is not present. The value of the test in eye lesions may be appreciated from the following statistics:

Cohen[13] reports:

Iritis	23 cases	7 positive
Parenchymatous keratitis	9 cases	6 positive
Choroiditis	3 cases	2 positive
Optic atrophy	6 cases	4 positive
Neuroretinitis	4 cases	1 positive
Choked disc	5 cases	5 negative
Paralysis of muscles	5 cases	1 positive

11. Berl. klin. Wchnschr., No. 50, 1907, page 1599.
12. Berl. klin. Wchnschr., No. 1, 1908, page 14.
13. Berl. klin. Wchnschr., No. 18, 1908, page 877.

Reflex iridoplegia	1 case	1 negative
Opthalmoplegia interna	1 case	1 positive
Central scotoma	1 case	1 negative
Atrophy of retina	2 cases	1 positive
Atrophy of the iris	1 case	1 negative
Vascular macula of the cornea	1 case	1 negative

Of all these cases only 12 were clinically luetic, yet 23 gave a positive reaction, showing that in 10 cases he was enabled to make a diagnosis by means of the Wassermann reaction.

More convincing still are the statistics of Leber.[14] He examined 160 cases; 31 clinically were not syphilitic. In those cases that were clinically syphilitic 92 per cent. were positive.

In 95 cases syphilis could not be excluded; neither could it be proven. Forty-two were positive. These include: Keratitis parenchymatosus, 31 cases, 83 per cent. positive; iritis, 48 cases, 33 per cent. positive; choroiditis and retinitis, 23 cases, 26 per cent. positive. He calls special attention to the great value of the reaction in diagnosing retinitis and choroiditis.

Fleischer[15] also calls attention to the value of the serum test in optical lesions. In 10 cases of keratitis parenchymatosus 9 positive, 1 negative. In 6 cases of iritis 1 positive, 5 negative. This agrees with the clinical experience that iritis is more often tubercular and keratitis luetic.

From these statistics we are able to judge that the Wassermann reaction in eye lesions is just as valuable as in other branches of medicine and surgery.

Cohen's opinion in regard to the serum diagnosis in eye lesions is as follows: (a) If negative it gives certain diagnostic points. (b) If positive it is decisive for diagnosis and treatment. In conclusion we have the following to say:

1. That *Spirochætæ pallidæ* are present in all syphilitic lesions, including those of the eye.

2. In chancres and mucous patches the diagnosis should be made by the demonstration of the spirochete.

3. All other lesions of the eye of syphilitic origin may be diagnosed by means of the Wassermann test.

4. Eye conditions depending upon pathological changes in the nervous system of syphilitic origin may be diagnosed by the Wassermann test.

5. All doubtful cases that might be explained on a syphilitic basis should be given the Wassermann test.

109 Randolph Street.

14. Berl. klin. Wchnschr., No. 12, March, 1908, page 618.
15. Berl. d. ophth. Gesellsch., Heidelberg, 1908, page 256.

ILLINOIS MEDICAL JOURNAL

THE OFFICIAL ORGAN OF THE ILLINOIS STATE MEDICAL SOCIETY.

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AUGUST, 1909.

THE NEW BOARD OF ADMINISTRATION.

The members of the State Medical Society, having had a great influence in bringing about a change in the administration of the eighteen charitable institutions of Illinois, will be pleased to know that Governor Deneen has appointed as members of the first board men who are calculated to bring the institutions to the highest point of excellence.

We must first congratulate the members of the Board of Charities who have succeeded in legislating themselves out of office. Individuals of smaller caliber might have been members of the old Board and might have delayed indefinitely the consummation of much needed reforms.

Fortunately, Drs. Billings, Hirsch, McAnally and the ladies, Bourland and Lathrop, were individuals of high ideals, laboring only for the good of the unfortunate inmates of the asylums and hospitals, and self never entered into the proposition. Upon them fell a large part of the burden of securing the new law, and to them must be given a large part of the credit.

For many years petty politics of the towns and villages where these institutions were located have been a source of annoyance and weakness to the Governors of the State. The institutions were made a part of the political machine which ambitious politicians endeavored to create, but usually the result was far different from that which was desired. Instead

of becoming a source of strength, they became a source of weakness. The Governor, however, has profited by the mistakes of his predecessors and he will, with us, hope that the new law has been so wisely framed and will be so tactfully administered that politics in the State institutions of Illinois will never more be heard of. There is no evidence of selfish political motive on the Governor's part in the appointment of these gentlemen.

The new Board has for its head ex-Lieutenant Governor L. Y. Sherman, a man above reproach and practical, capable and progressive. That he will be successful in this new position we feel certain. The alienist is Dr. Greene, of the Kankakee institution, who came to that responsible position from Nebraska and made good. He is said to be an administration officer of exceptional ability. Mr. Frank D. Whipp, who has been made fiscal agent of the Board, has been engaged in work of this character for years and is probably better adapted for the position than any man in the State. The other members, O'Connor, former mayor of Peoria, and Judge Burroughs, of Edwardsville, are said to be clean, capable and representative citizens. We congratulate Governor Deneen on his appointments to these high offices. We understand the members of the Board will begin their term of office Jan. 1, 1910. Mr. W. C. Graves will probably remain as the executive officer of the Board. His long experience will make a valuable official.

THE LEGISLATIVE RECORD OF VOTES ON THE PASSAGE OF THE OSTEOPATHIC BILL.

The publication of the votes of the members of the General Assembly on osteopathic legislation has seemed to stir up a great deal of interest among the members of the General Assembly, which has been augmented by the letters a number of these gentlemen have received from their constituents regarding the stand taken by them on this important matter. In the confusion of the late hours of the session it is possible that some mistakes were made in the records, but undoubtedly the publication as given in our last issue pretty accurately represents the stand of the various members on this matter. Those members of the State Society who have not yet written to their members commending or condemning their stand in this matter should do so at once in order that all mistakes may be corrected as soon as possible and in order that an active campaign may be made to prevent the further political activity of those gentlemen actively supporting osteopathic measures.

In this connection we will state that it has come to our knowledge that Senator Clark, of Chicago, was opposed to the osteopathic bills, although he seemingly voted at one time in favor of them. It seems that Senator Clark is a dealer in dental supplies and has been an active supporter of the legislation favored by the Illinois State Dental Society, and it is to him that the society owes a great part of the valuable legislation they have obtained in Illinois. Senator Clark is probably undoubtedly aware of the unscientific character of the osteopaths and would hardly be found in the ranks of those supporting such a movement.

H. T. Ireland of Washburn claims that his record is incorrectly given and writes as follows: "This bill was up twice. The first time I voted against it, but before finishing the roll call the friends of the bill saw defeat and it was postponed. The next time the bill was called up was at a night session, when I was absent, no notice having been given of further action.

"As you perhaps know, I have a son who is a practicing physician at this place and it appears absurd that I would favor the Osteopath Bill. I will appreciate your efforts to correct the error, which does me a great injustice."

Michael S. Link of Mitchell, Madison County, claims that he is incorrectly recorded as voting for the bill. It has been proven to our satisfaction that he voted against the bill.

The committee has also received a letter from Representative Frank W. Shepherd which Dr. Whalen informs us is justified. It appears that Henry A. Shepherd voted for the bill and that Frank W. Shepherd did not vote. Thomas Campbell of the Thirty-Third district voted for the bill, while he is credited in the last issue with not voting. Dr. Whalen suggests that Mr. Campbell be given all the glory he is asking for with his constituents and suggests that the Thirty-Third, Fourteenth and Thirty-Eighth districts' votes be published over again and we accordingly give the vote of the members from these districts. So far as we have been able to learn, the publication of the vote has stirred up the members quite a little and will no doubt do good in the future.

FOURTEENTH DISTRICT

The Counties of Kane and Kendall

Thomas B. Stewart, N. V.	Kane	Aurora
Arwin E. Price, N. V.	Kane	Elgin
Frank W. Shepherd, N. V.	Kane	Elgin
George W. Alschuler, A.	Kane	Aurora

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THIRTY-EIGHTH DISTRICT

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Louis P. Daley, N. V.	Macoupin	Carlinville
Henry A. Shepherd, F.	Jersey	Jerseyville

THE ATLANTIC CITY MEETING.

The meeting of the American Medical Association at Atlantic City, while not so largely attended as the recent meeting in Chicago of the organization, was a thoroughly representative body and quite successful. The weather was, unfortunately, very disagreeable and much of the pleasure of attending a meeting at the resort is lost when disagreeable weather prevails. This was especially to be regretted because there seemed to be an unusually large number of wives, daughters and sweet-

hearts of the medical men in attendance and entertainments arranged for them were, of necessity, nearly all abandoned.

The reception given to Secretary Simmons was extremely flattering and his friends in addition presented him with a valuable watch and chain, with a loving cup to Mrs. Simmons, as a mark of their continued confidence and esteem. He was given a three months' leave of absence.

The papers read in the sections were all interesting, but nothing very unusual developed in any one subject as far as we were able to learn.

The suggestion of President Gorgas, originated by Dr. S. Weir Mitchell, that a monument be erected at Washington to the memory of the physicians, both Federal and Confederate, who lost their lives in the Civil War, was a happy thought and testifies to the complete amalgamation of all sections of the country. It leads one to believe that, through medical men the world over, all nations will be brought into harmony and dreadful wars of the past will be no more seen upon the earth.

The finances of the Association were reported in excellent condition and the trustees were authorized to at once begin the erection of a $200,000 building in Chicago, for which they have ample funds to pay.

The growth of the Association for the past ten years has been something phenomenal, and, while there has been some discordant elements developed, it is probable that the next ten years will show a still more remarkable consolidation of the medical interests of the country.

The election of Dr. William H. Welch of Johns Hopkins University to the Presidency was a compliment to Professor Welch and worthily bestowed. Dr. Welch will bring the Association years of high reputation as a student and a teacher.

The selection of St. Louis for the next annual meeting will enable the physicians of the Great Mississippi Valley, now universally considered the center of the country, to gather in large numbers and we prophecy a record-breaking meeting in 1910. Certainly a large number of Illinois physicians will find it convenient to go to St. Louis.

THE CONSOLIDATION OF MEDICAL COLLEGES.

All over the country a movement is in progress to diminish the number of medical colleges and the state societies are using their great influence to bring this about. The latest movement is in Arkansas, where two small colleges have been struggling for years, neither of them having the respect of the medical fraternity or attracting nearly all the students from their own state. The matter had gone so far that the council of the state society at its last meeting passed a resolution calling for the consolidation of these colleges in the best interests of the medical profession of Arkansas. The president appointed a committee of ten, none of them residing in Little Rock (where both colleges were located), and it is believed that this committee will force the union of the two schools.

Mergers have been consummated by the union of five medical schools at Louisville, Ky., into one, two at Cincinnati, and two at Indian-

apolis. The two schools so long existing at Keokuk, Iowa, have been merged into the medical department of Drake University. The Minneapolis and St. Paul schools have been merged into one. Two California schools have been merged into one; and thus all over the country the movement has become so general that we hope for the beginning of a better era in medical education.

One of the few remaining cities where a superfluity of medical schools exists is the metropolis of Illinois, where no fewer than thirteen schools are found. Some of these are said to be little better than "quiz classes," and it is a serious question whether the time has not arrived for the Illinois State Medical Society, through its council, to take up this matter seriously and call for the union or disbanding of at least half of these schools. It is certainly little to the credit of the home of *The Journal of the American Medical Association* to have this disgraceful condition of medical education.

VACATION TRIPS TO EUROPE.

There seems to be almost an epidemic of European travel among the physicians of Illinois and other states during the present summer. More than two score are said to have gone or are going from Chicago and from the state outside of Chicago probably fifty or sixty more, making at least one hundred altogether. Many are making the trip for the first time and will stay for more or less prolonged periods of study. Others are making their trips for rest and recreation, finding that no trip is so restful and invigorating as an ocean voyage and contact with the civilization of the old world. Among those going for study is Dr. George Edwin Baxter of Chicago, the Assistant Editor of THE JOURNAL, who will study in Vienna and return about Jan. 1, 1910.

THE CARROLL FUND.

Those of our members who were present at the House of Delegates when an appropriation was made by the State Society for the relief of the widow of Dr. Carroll will remember the enthusiasm with which this appropriation was made and will be glad to read the following correspondence in reference to the gratuitous contribution made by the State Society. They will also be pleased to learn that through the munificence of the various professional bodies of men throughout the country the mortgage has been lifted from the home of the Carrolls and that the Kissinger fund is sufficient to provide for Private Kissinger probably as long as he lives.

War Department,
Office of the Surgeon General,
Washington, June 1, 1909.

MY DEAR DR. WEIS: Your letter of May 29 with enclosure has just been received. I have no words to express my gratification at the action of the State Medical Society of Illinois in response to the appeal for the relief of the widow of the late James Carroll. The contribution from your state is by far the most substantial any medical society or organization has given, and I think members of

your state society should be proud of the public spirit that prevails in your organization. Another matter that is a source of gratification is the fact that this large contribution comes from a state where yellow fever has never been a live issue. A receipt is enclosed for $500, as you will probably need it to file with your vouchers. Assuring you of my high regard, believe me,

Very sincerely yours,

[Signed.] WM. B. IRELAND.

DR. EDMUND W. WEIS, Secretary Illinois State Medical Society, Ottawa, Ill.

Department of Bacteriology,
Harvard University Medical School,
Boston, June 1, 1909.

MY DEAR DOCTOR WEIS: I find in my mail to-day your letter under date of May 29, transmitting to me the check for $100 to be added to the Kissinger fund, as the result of the action of Dr. Frank Billings and the vote of the House of Delegates of the Illinois State Medical Society.

May I ask you to convey to the delegates my gratitude and appreciation for this substantial addition to the fund which we are collecting? The money thus far in hand amounts to a little over $3,300, and, if we should receive no more, it would serve to keep this couple from want for a very considerable length of time. With renewed thanks, believe me, very faithfully yours,

HAROLD C. ERNST.

DR. ATKINSON NOT DESTITUTE.

Some of the medical journals in Illinois have been endeavoring to raise quite a disturbance concerning the alleged destitution of Dr. W. B. Atkinson, of Philadelphia, Pa., former Secretary of the American Medical Association. Being somewhat suspicious of the sudden interest developed by these journals, we took the liberty of making enquiry of a friend in Philadelphia, where Dr. Atkinson has lived for half a century, and received the reply which we print below and which indicates that the statements made in these journals, as well as in several others over the country, are quite incorrect:

"My Dear Doctor:—Your letter making inquiry about Dr. Atkinson has been received. I was rather surprised at the information it contained, as I felt sure that if Dr. Atkinson was in destitute circumstances his friends would have heard of it. As I had not seen him for some time, I took occasion to visit him. He has been suffering for several years from paresis. He is very deaf, and it is only occasionally that he is able to recognize any one. He lives in Germantown, one of our most pleasant suburbs, in a three-story house, has a nurse, and I noticed that they had a servant, the house looked very well furnished, and so on. I saw him and had a talk with him, and as I came away his wife volunteered the fact that the Doctor had never been a very good manager, and that it kept her counting in order to take care of everything and keep it running; they were not able to have a trained nurse, but that they had a very good nurse. Further, that the County Medical Society in Philadelphia has a Medical Aid Association, of which Dr. Atkinson was for a long time one of the officers. If he has been at any time in want, there would not be any need of his making application, as the money would be furnished him by his friends here. So you can rest assured and assure others that Dr. Atkinson is not in need of assistance from the American Medical Association."

County Secretaries' Page.

A suggestion was made at the last Secretaries' Conference that we ask the editor of THE JOURNAL for a page to be devoted to the county secretary and his work. The matter was taken up with Dr. Kreider, and here it is. Let us make use of it each month. Suggestions for program, questions in regard to policy in general and in specific cases, ideas in regard to notices, and in fact anything that you are doing that might interest other secretaries will be gladly given space. There will be a portion of the page devoted to a question box and answers, and it is hoped that you will make use of the same.

CONVENTION ECHOES.

"Start a monthly publication. The printing does not cost much more than postals and by having it entered as 2d class matter the postage will surprise you." McLean County has had one for some time and it is a success. Fiegenbaum, of Madison, and Steely, of Vermilion Counties, will soon follow suit and all should get on their mailing lists. Do not forget to exchange with Donaldson, of Pennsylvania. His publication is called the *Medical Program of the Medical Organization of Washington County, Pa.* His address is Canonsburg, Pa. Be up and doing with your copy for the printer. Do not be afraid of printers' bills. Give your society publicity among the profession. Here is a sample letter of a Wisconsin secretary:

My Dear ————————:

You are hereby appointed a "Royal High Barker" for the county medical society for 1909. Your duties are: to attend every meeting, bring all your friends, your agreeable neighbors and those you want made agreeable—even if force is necessary. You are also to bark for the good of the society throughout the year, in season and out of season. Personally, I am offering a golden crown and a halo for every man who does not miss a meeting in 1909. Now is your chance, if ever. Cordially yours,

"The successful county secretary is the one who is 'always on the job.'"

"See that your older members have some committee work that they like and consult them often. Our experience has been that the more meetings you have the better the attendance is and the more interest manifest."

"Keep a biographical record of all your members."

"Be prompt in your correspondence and keep copies on file."

"Report your officers-elect immediately to the state secretary."

"Make accurate and prompt reports of all changes in or additions to your membership after each meeting."

Keep a complete list of all practitioners in your county, both members and non-members.

Do not go to bed until the minutes of your meeting are all written up.

Get on the mailing list of all the Live Wires and do not forget to make use of the secretary's page in THE JOURNAL. C. H. L.

Correspondence.

THAT OSTEOPATHIC BILL.

To the Editor:—A few weeks ago the medical profession of the whole state was wrought up over the "Osteopathic Bill" which was before the Illinois Legislature, and we all wrote personal letters to our representatives at Springfield.

There are three representatives from each district, and I wrote to all three from my district. Two of them answered my letters, stating that they would not vote for the bill mentioned. One representative did not answer my letter and later avoided voting when the bill came up for roll call.

I further note that there were representatives who voted for the osteopathic bill and others who dodged the issue.

Doctor, are any of these men from your district? If so write them for their reasons. Surely they have a reason for the faith that is in them. If your representative received more requests to vote for the osteopathic bill than he did to vote against it, he was justified in voting yea. It is your duty to take an interest in the community's welfare. Write your representative now and ask him not to vote for such a bill again when it comes up again.

If your representative did not vote at all, he is probably in doubt as to what his constituents want. Now, do not leave him undecided any longer. Write him to-day and let him know your convictions on this matter. We not only want this bill defeated, but the spirit killed. Also every other bill that tends to lower the character, either moral or educational, of the profession. We want to raise the standard of the profession in every way, and it is up to you to help right here.

If your representative voted against the osteopathic bill, just drop him a line to-day and thank him. You like to have your patient thank you for what you do. So does your political representative want your approval when he works in your behalf, and whether you voted for his election or not you owe him a "thank you" and he will appreciate it.

The Bulletin of the Chicago Medical Society of May 22, on page 7, says: "Osteopaths Defeated." Now, don't you believe it. They did get a short upper jab and they have taken the count, but they will be back at the old stand again shortly and we will have to meet them better trained and prepared. You must let your legislator know where you stand. Get busy and write every one a letter TO-DAY. I wrote mine. DO IT NOW.

CHARLES J. DRUECK, M.D., 599 East Forty-sixth Street.

COUNTY AND DISTRICT SOCIETIES

ADAMS COUNTY.

The regular monthly meeting of the Adams County Branch of the State society was held July 12 in the usual place. Dr. Knox, the vice-president, called the meeting to order. Others present were Drs. Nickerson, Bates, Mercer, Spence, Center, Christie, Jr., Shawgo, J. B. and Kirk, Rice, Ericson, Koch, Brenner, Williams, W. W. Becker, Knapheide, Pfeiffer, Grimes and Wells. Visitor, Dr. Green. Dr. Shawgo, as chairman of the entertainment committee, made a report suggesting that the annual outing be held at Highland Park at the time of the August meeting. Suggestion was approved by the society and the committee, with the addition of the secretary, was instructed to make the final arrangements. Dr. Nickerson made report of the vote of our various representatives in the legislature as regards the osteopathic bills and offered a letter commendatory of the stand and vote of Senator Campbell S. Hearn and Representative Geo. H. Wilson. A copy of this letter was ordered sent to the gentlemen. Representatives Groves and Bolin voted with the osteopaths on every bill. Resolutions anent the matter of the Ancient Order of Shepherds, a fraternal, free medical service society were read. They were to the effect that any member of the society engaging to do their practice or make examinations for them would be considered guilty of unprofessional conduct and subject to disciplinary proceedings. Luncheon was served at the Hotel Newcomb. In the afternoon Dr. W. S. Knapheide presented an interesting paper on "Syphilitic Arthritis of the Knee and Elbow Joints," which was discussed by Drs. Christie, Williams and Nickerson. Dr. Becker read a paper on "Cholera Infantum" which was timely, and contained interesting and valuable points. This paper was discussed quite generally.

Adjourned.

CLARENCE A. WELLS, SECRETARY.

COLES COUNTY.

The Coles County Medical Society met at Charleston July 6, 1909, in the Court House. Dr. Bennet being absent, Dr. Dudley, the vice-president, presided. The minutes of the April meeting were read and approved. Dr. R. H. Craig gave a report of the state meeting. Dr. T. O. Freeman read a paper on "Operative Appendicitis," which was discussed by Drs. Montgomery, Alexander, Craig and Voight. Dr. J. W. Alexander read a paper on "Tubercular Peritonitis," with a report of seven cases. This was well discussed by all the members present. Dr. N. C. Iknayan read a paper on "Diet in Diabetes." Dr. Voight followed with a paper on "Glaucoma in Diabetes." This paper was discussed by Dr. Bell.

R. H. CRAIG, Sec.

COOK COUNTY.

CHICAGO MEDICAL SOCIETY

The following is a list of officers for the ensuing year, declared elected by the Election Committee of the Chicago Medical Society at its annual election, June 15, 1909:

President—John A. Robison.

Secretary—George F. Suker.

Councilors at Large for Three Years—George W. Webster, Merlin Z. Albro, William Senn, Edward A. Fiskin and C. C. O'Byrne.

Alternate Councilors at Large for Three Years—Willis O. Nance, James P. Houston, John Edwin Rhodes and Bernard Fantus.

BRANCH SOCIETIES

NORTH SIDE BRANCH

President—Rudolph Holmes.
Vice-President—William Hessert.
Secretary—Paul F. Morf.
Councilor—Robert B. Preble (two years).
Alternate Councilor—C. G. Buford (two years).

NORTH SHORE BRANCH

President—C. M. Robertson.
Vice-President—A. C. A. Gaul.
Secretary—Samuel J. McNeill.
Councilors—Clarence W. Leigh (two years), Thomas A. Hogan (two years).
Alternate Councilors—M. A. Griffin (two years), William G. Lee (two years).

EVANSTON BRANCH

President—G. W. Boot.
Secretary—W. C. Danforth.
Councilor—S. V. Balderston (two years).
Alternate Councilor—Alice B. Brown (two years).

NORTHWEST BRANCH

President—R. S. Michel.
Secretary—Melchior Whise.
Councilor—Charles R. Moore (two years).
Alternate Councilor—W. M. Burroughs (two years).

WEST SIDE BRANCH

President—D. W. Graham.
Vice-President—B. H. Breakstone.
Secretary—Bernard Fantus.
Treasurer—C. B. King.
Councilor—C. C. Rogers (two years).
Alternate Councilor—A. M. Harvey (two years).

AUX PLAINES BRANCH

President—J. W. Tope.
Vice-President—W. Even Baker.
Secretary—F. W. Kettlestrings.
Councilor—Charles Humiston (two years).
Alternate Councilor—J. W. Tope (two years).

DOUGLAS PARK BRANCH

President—V. F. Masilko.
Vice-President—J. H. Edgecomb.
Secretary—J. G. Carr.
Councilor—J. L. Abt (two years).
Alternate Councilor—E. E. Cunat (two years).

STOCK YARDS BRANCH

President—S. T. Felmlee.
Vice-President—S. L. Fridus.
Secretary—L. J. Isaacs.
Councilor—Hugo E. Betz (two years).
Alternate Councilor—D. R. Landau (two years).

ENGLEWOOD BRANCH

President—M. W. Bacon.
Vice-President—A. C. Kleutgen.
Secretary-Treasurer—C. Hubart Lovewell.
Councilor—Carl Langer (two years).
Alternate Councilor—C. J. Hagens (two years).
Members Englewood Council—W. E. Bohart, J. G. Campbell.

SOUTH SIDE BRANCH

President—William Fuller.
Secretary—Otis H. Maclay.
Councilors—J. L. Miller (two years), G. Frank Lydston (two years), E. B. Tuteur (two years).
Alternate Councilors—E. P. Norcross (two years), M. M. Portis (two years), J. F. Burkholder (two years).

SOUTH CHICAGO BRANCH

President—Don S. Harvey.
Secretary—John S. Stanton.
Treasurer—D. Staneff.
Councilor—E. E. Tansey (two years).
Alternate Councilor—J. A. Anderson (two years).

NORTHWEST SUBURBAN BRANCH

No report received.

CHICAGO HEIGHTS BRANCH

No local election of this branch.

CALUMET

President—C. Clayton.
Vice-President—Raymond C. Libberton.
Secretary-Treasurer—W. H. Conner.
Councilor—J. Kaufman (two years).
Alternate Councilor—G. Seim (two years).

Regular Meeting, April 28, 1909.

A regular meeting was held April 28, 1909, with Carl Langer, president of the Englewood Branch, in the chair. Dr. E. C. Bullock, Silver City, N. M., read a paper entitled "Twelve Years of Phthisiotherapy in the West," which was discussed by N. S. Davis, Theodore B. Sachs, J. F. Hultgen, E. F. Ingals, a member, and Fenton B. Turck. Adjourned.

DISCUSSION ON THE PAPER OF DR. BULLOCK.

Dr. N. S. Davis:—I wish to express my thanks to Dr. Bullock for the interesting paper he has just read, and I am sure I express the thoughts of those present here when I say that I have not for a long time listened to a discussion of the effects of climate in tuberculosis more carefully throughout than the one Dr. Bullock has made. I have been convinced from an early period of my practice of the efficacy of climatic treatment when it was properly carried out. I mean by that, when a patient lived properly in a good climate. Let me place the subject of climatic treatment before you in this way: We all admit to-day the possibility of effecting a cure in many patients afflicted with tuberculosis in any and all climates. Many of us have seen cases of tuberculosis recover in Chicago or its neighborhood. I have now in mind the case of an individual, who is apparently cured, though she lived here in the city and has, moreover, led a convent life, which are conditions as unfavorable as well can be. Although we may admit that patients may be cured or at least apparently recover in any climate, I believe that we must admit that it can be accomplished more comfortably and more certainly in certain places than in others. For instance, we would not by choice treat a patient affected with tuberculosis in its incipiency or slightly advanced by confining the patient constantly to the house. Nor would we by preference treat such a patient in a large city, where people live in-doors and not out-of-doors, and where, even if one lives out-of-doors, he will be constantly in an air vitiated by deleterious dusts, smoke and gases. There are also climatic conditions which make certain localities much more favorable for the treatment of tuberculosis than others. Since it is essential to the treatment of this disease

that those having it spend most or all of each twenty-four hours in the open air, is it best to demand this in a locality which necessitates a fight against climatic conditions or where such a life can be led in comparative comfort? In the neighborhood of Chicago during the winter season we have to make a real fight against climatic conditions, and therefore we seek to escape this struggle by housing ourselves, by traveling in closed cars and other vehicles and in every way endeavor to escape from our natural environment. Yet the tuberculous patient must be kept constantly in these conditions, in the most inclement season of the year, conditions from which the healthy strive to escape. There are certain climates in which the outdoor treatment can be carried out to the greatest advantage and much more comfortably. The best is one that is dry, that is elevated, and that ensures a maximum of sunshine with agreeable cool weather in winter and no excessive heat in summer. These conditions can be found on the elevated plateaus and in the valleys of the Southwest. That such a climate insures greater success as well as more comfortable treatment, the statistics and the analysis of climatic conditions, which Dr. Bullock has given us to-night, are convincing. Nevertheless, he has placed these facts very fairly before us, and admits that while it is the climate of choice it is not possible or best to attempt to treat every patient there. The possibility of effecting an arrest of the disease is not so much greater in the West than here, but it is somewhat greater, for he shows that the possibility of prolonging life or effecting a cure by a residence in the West is increased by a decided percentage.

Another point which Dr. Bullock mentioned, but which I feel he did not emphasize as much as it should be emphasized, is that more important than climate is the guidance the patient is under. A patient is not likely to do well in whatever climate he is placed if he is not under proper guidance or proper and continual supervision. Moreover, it is not every physician who is able to supervise well patients afflicted with tuberculosis, and to lead them to recovery. Therefore, it is very essential, at all times, in prescribing for a patient afflicted with tuberculosis to place the patient in the hands of one whom we know will manage him properly and surely. Therefore, when we consider the difference between the various sanatoria, it is not a question of brick and mortar; it is not simply a question of surroundings, or always so much one of climate as it is of the man under whom the patient is to be placed. Of the elements which must work together to bring about favorable results in a tuberculous patient, the first is the right kind of guide, the second out of doors treatment, and third, when possible, the best climatic conditions.

Dr. Theodore B. Sachs:—I was glad to hear the views of Dr. Bullock, whose experience in treating tuberculosis in high altitudes extends over many years. Sanatorium regime plus favorable climate, for those who financially and otherwise can afford it, is sound advice. Unfortunately, but a small number of the tuberculous sufferers can avail themselves of climatic treatment under proper conditions, and the number becomes smaller yet if you enforce the dictum, "permanent residence in the climate in which 'cure' is accomplished." This implies such an outlay of money and such a radical rearrangement of your life's interests that it is within the reach of but very few.

Bearing all this in mind, it must be admitted that favorable climate is a factor to be considered when other essentials of modern treatment of tuberculosis are complied with. The climate itself has to be chosen, of course, with great care, as high altitude is applicable in some cases and harmful in others, etc. Thus, considering the narrow range of application of "climate" in dealing with the tuberculosis problem in general, where tens of thousands are involved and ninety-nine out of a hundred must be treated at home, we appreciate the vigorous campaign of tuberculosis workers all over the world for sanatoria in "home climates." The results in such institutions in our own country compare very favorably with those in the West. The recent successful campaign for a municipal sanatorium in Chicago was based largely on the results of our own institution, the Edward Santorium at Naperville, a department of the Chicago Tuberculosis Institute.

We must take care of our own tuberculous population, for the benefit of thousands that are to be saved and the tens, hundreds of thousands, that are to be instructed through the operation of such institutions in our midst. I beg to differ with the Doctor in his absolute denunciation of specific therapy as a part of treatment of tuberculosis. Dr. Trudeau, who for the last twenty years employed tuberculin as an adjunct measure in carefully selected cases at the Adirondack Cottage Sanatorium, proved some years ago by an analysis of subsequent history of discharged cases that the "results" are more permanent in those treated with tuberculin.

During the last few years the remedy has grown in favor, being employed in many sanatoria, in small initial doses (Bacillen Filtrate .0000001 c.c.) gradually and carefully increased, to avoid unnecessary reaction. Bacillen filtrate is used as an accessory measure in selected cases at the Edward Sanatorium at Naperville. During two years of its administration no harmful results were ever observed, while in a number of stationary cases (in which it is chiefly employed) further improvement followed the introduction of tuberculin as a part of treatment.

The remedy should be employed with caution and under conditions in which continuous observation of the patient is possible. For that very reason its range of application in private practice is naturally limited. It is very unfortunate that tuberculin is becoming lately the means of the charlatan in wringing tribute out of the disheartened consumptive who easily is drawn to any "panacea" offered to him. The essentials of treatment of tuberculosis remain the same: Outdoor life, nutritious diet and regulated rest and exercise; tuberculin therapy is but an accessory measure, to be used in selected cases and under conditions of utmost caution.

Dr. J. F. Hultgen:—I think we can all compliment Dr. Bullock on the excellent paper he has given us to-night. The work he has done will stand the test of time. Yet, while his facts are facts, I do not believe his interpretations represent the ideas of men who are engaged in tuberculosis work. Some people, for instance, are extremists in feeding. Osler, in one of the last editions of his book, says: "The cure of tuberculosis is a question of nutrition. Digestion and assimilation control the situation. Make the patients fat and the rest will take care of itself." Again, a few have gone astray with regard to the exclusive use of tuberculin. Some time ago our colleagues told us that they used tuberculin and nothing else, and with it they were able to effect a very large percentage of cures among people in this town who could not afford such luxuries as the New Mexico climate. Again, others have advocated the climatic treatment to the extreme test of our patience. Dr. Bullock's statistics show that by the climatic treatment alone, such as is afforded by the Government Sanatoria in New Mexico, the results are better than those obtained in four Eastern institutions. This may be true for some time yet, but I think a comparison from the same institutions two years from now will show different results.

The Doctor related his experience with regard to the use of tuberculin. He has used it in sixty-seven cases. I do not think we can draw any reliable conclusion from such a small number of cases. If he had used it in six hundred or seven hundred cases then there would be reason for drawing some deductions regarding its value. He is too much against it to suit me. There is no question nowadays about the specificity of tuberculin. No other biological product has the effects tuberculin has. In the first place, it has a specific effect upon tuberculous lesions. That has been proven. It has been shown in cases of lupus and in tuberculides. It also affects directly the pulmonary lesions. Anybody who has had experience with tuberculin in tuberculosis of the lungs knows that after the first injection or so the pulmonary symptoms improve; the râles disappear after the injection of tuberculin. Indeed, that is the first thing one observes. Everyone is impressed with the rapid local improvement after the first few injections with tuberculin. Some investigators have injected simply bouillon culture and glycerin, and have thought it would produce a specific inflammation in tuberculous patients. That has been tried in this country, and it does not produce such results.

Further proof for the specificity of tuberculin is the disappearance of the cutaneous reactions under its repeated and continual administration. When a patient has been pretty well treated and has done well for some time under tuberculin treatment, there comes a time when he does not react to the von Pirquet test, which, to almost everybody, proves that there is something being accomplished. Just why that is we do not know.

I notice that Dr. Bullock does not use anything as a guide, as, for instance, blood count or Wright's method. We should bear in mind that tuberculin can not be given without any guide. We should not leave the matter of administration of tuberculin to the patient or nurse. That is very bad practice, and can not be condemned too strongly.

We should turn our attention a little to the economic side of tuberculosis. Ninety-five per cent. of the tuberculosis cases, as Dr. Sachs has pointed out, are here in Chicago. Let us stay right here and settle this problem. It is entirely out of the question for these 95 per cent. of people to get away from their homes and go to other places for treatment. It is so very seldom that a patient has a thousand dollars to spend for this treatment and change of climate. We rarely find such patients in our clinic at the Chicago Policlinic. Our motto should be, the greatest good for the greatest number. We should not shift these people to another climate or to another state. We should keep in mind that tuberculosis is largely a question of pediatrics. It is a disease of infancy. The tuberculosis of the adult is simply the last part of the song that is begun at the cradle.

Dr. E. Fletcher Ingals:—I was very glad to hear Dr. Bullock's paper, because he has analyzed the statistics carefully. Impressions of cases are of very little value in estimating results. The paper speaks of Dr. Troudeau's impressions—if he analyzed his cases carefully he might have drawn different conclusions.

I am in perfect accord with Dr. Bullock as to the use of tuberculin. Those who use tuberculin say, if it is used in sufficiently small quantities, it does very little harm. That is correct. The smaller the quantity the less harm it will do. There is no doubt about its being an agent capable of great harm if used indiscriminately.

I have had quite a long experience in the treatment of tuberculosis, and have carefully taken histories of over 2,000 private cases. I regret that I have not analyzed my cases carefully, but I fully believe that, other things being equal, a good climate adds 50 per cent. to a patient's chances of recovery. I believe, too, that those who have spoken are entirely right when they say we will have to cure most of our cases here. The majority of them may undoubtedly be cured here, and it is certain that those who have not enough money to secure every comfort if they go away ought to stay at home. It is almost a crime to send poor patients away unless they can go where they can get the necessary attention and comforts at nominal cost.

I was surprised to hear the results obtained from high altitude in advanced cases of tuberculosis. High altitude has not seemed to me desirable for such patients.

Sanatoria are very helpful for people who are not able to obtain similar or as good attention elsewhere, but I do not think they are of any special value to those patients who can afford to pay for equal skill and comforts at home or better in a good climate.

It is interesting to notice the general trend of the profession with reference to the treatment of tuberculosis. It is supposed by many that in the last thirty years we have discovered that high altitude, a clear atmosphere and a great deal of outdoor air are important in the treatment of tuberculosis. We have made no new discovery, for Galen and even Hippocrates taught the same thing. We have not advanced so much in the treatment of tuberculosis as generally supposed, but the public has been frightened into better observance of hygienic laws.

A Member:—In attempting to analyze the tuberculosis problem, I think the matter resolves itself into this, that tuberculosis is a calamity to a community and can be handled only in that community in which the calamity occurs. Fully 90 per cent. of the tuberculous patients we see are unable to take advantage of climate and altitude. Therefore, the problem with which we are confronted is to

maintain the institutions that are going to handle tuberculous cases in this community. The rich, the 5 per cent., can surely be taken care of, and from the standpoint of our pockets it is more important to think of the other 95 per cent. If we desire to get rid of tuberculosis in a community the greatest care must be taken in treatment, and our attention must be devoted to these 95 per cent.

Dr. Fenton B. Turck:—I think the essayist is entitled to a very thorough and free discussion of the subject he has presented, and I do not think the members have discussed his paper as they should have done. The paper was on the physiological effects of high altitude in the treatment of tuberculosis. He attempted to show by statistics certain results which he had obtained just as we carry out in the laboratory certain methods and obtain certain results, and present them with our protocols and such deductions as we may see fit to make.

An important point brought out was the reaction which occurs on the blood pressure and blood corpuscles. We know that future development in the combatting of this disease will be in the direction of sera in some way, and while this is accomplished somewhat empirically at present, in the future it may be done scientifically, and the reactions that occur in open air and high altitudes are evidently producing a certain amount of antibodies against infection. It is to be hoped that in the future some biological researches will be made which will corroborate some of the points mentioned in this paper, particularly the explanation of the reactions he has found clinically, so that we may have a scientific explanation and a better application of the principles that are involved.

CHICAGO MEDICAL AND CHICAGO SURGICAL SOCIETIES.

Joint Meeting, May 5, 1909.

A joint meeting of these societies was held May 5, 1909, with Dr. A. E. Halstead, president of the Chicago Surgical Society, in the chair. Dr. Dudley P. Allen, of Cleveland, Ohio, read a paper, by invitation, entitled "Late Manifestations of Intracranial Hemorrhage of Traumatic Origin." The paper was discussed by Drs. A. J. Ochsner, John B. Murphy, Arthur Dean Bevan, S. C. Plummer, Hugh T. Patrick, Archibald Church and, in closing, by Dr. Allen. On motion of Dr. Murphy a rising vote of thanks was extended to Dr. Allen for his able presentation of the subject.

LATE MANIFESTATIONS OF INTRACRANAL HEMORRHAGE OF TRAUMATIC ORIGIN

Dr. Dudley P. Allen, of Cleveland, Ohio (by invitation): Injuries of the head, seemingly slight, and followed, if at all, by a short period of unconsciousness, may cause intracranial hemorrhage. This may occur at the point of injury or on the opposite side by contrecoup. There may be no fracture of the skull, or, if present, the fracture may be only linear, with no depression. If unconsciousness occurs, this symptom may be permanent. A period of lucidity, followed later by unsconsciousness, is the best marked evidence of intracranial hemorrhage.

The paper does not discuss grave injuries with extensive fracture, nor those in which unconsciousness has been continuous or has returned quickly. In the cases presented the shortest period until the return of symptoms is fourteen days, and the periods before operation vary from sixteen days to nine months. In the twenty-seven cases which are analyzed, the clot was subdural in 26. In one it was reported as subarachnoid.

The paper discusses the various symptoms occurring in such cases, such as headache, vomiting, slowness of speech, slowness of motion, paralyses, eye symptoms, etc.

Skulls were presented to show the distribution of the meningeal arteries. Specimens of bone grafts in the skulls of dogs were also shown.

DISCUSSION

Dr. A. J. Ochsner:—I have encountered but one typical case of subdural clot, and it was that of a cattle owner in Montana, who was struck across the head

with a chair. He was knocked down. He rose at once, walked to his home, and was apparently well for two months, at the end of which time he began to suffer from headaches. The symptoms came on so late after the injury that, at first, they were not attributed to the proper cause, and it was only after two years had elapsed the patient became a raving maniac, and was paralyzed on the right side. It then occurred to the people that possibly the condition might have some relation to the primary injury. The man was brought to Chicago, trephined and eight ounces of a dark sanguineous fluid was removed. The left frontal lobe had been pushed to the right, so that the condition of the patient seemed hopeless. Within twenty-four hours, however, the patient began to speak and within two months he was apparently normal. This was in 1891.

Dr. John B. Murphy:—It does not appear that the formation of a clot played a very important rôle in a large percentage of the cases reported by Dr. Allen. It appears to have been fluid. The same kind of cyst that has been mentioned we see occasionally in fractures attended with non-union and remaining indefinitely without absorption, until there is a disturbance in some way, when absorption takes place rapidly. Dr. Allen has shown that it was not the blood which plays the important rôle, but the pressure produced by the transudation, and this continued after the blood was removed. Another important point is that in nearly all of them the hemorrhage was subdural. Hemorrhage occurs from the middle meningeal artery, and where the clot is sufficient to produce compression the patient has symptoms coming on rapidly if the vessel has been ruptured. In operating on a case of hemorrhage from the middle meningeal artery, we rarely have the bleeding going on at the time we operate, but if we disturb the clot the bleeding starts. The relationship of the middle meningeal artery to extradural hemorrhage is so thoroughly understood and its control so easily and readily effected by ligation of the external carotid, that it is astonishing sometimes to see what can be accomplished by this ligation. Ligation of the external carotid at the angle of the jaw will stop hemorrhage. The immediate indication in hemorrhage from the middle meningeal artery is to stop bleeding. One does not have to open the skull to do this. He can do a very simple operation, namely, expose the external carotid just above the angle of the jaw and apply a ligature to the bleeding vessels.

With reference to exposing the brain, shall we do a submuscular excision of the bone in decompression, or shall we use a bone flap? It seems to me, in the small number of decompressions we have to do for exposure of the middle meningeal artery, in its first portion, the removal of the entire bone is the better thing to do, but for the appearance of the patient an osteoplastic flap gives the best result.

Dr. Arthur Dean Bevan: After hearing Dr. Allen's paper and looking at his chart, certainly in the case in which the symptoms did not come on until eight months after the injury, we can not account for the symptoms from hemorrhage alone; that is, a hemorrhage the result of the trauma. What is the explanation? I believe we have here a pachymeningitis, a process which is imposed upon the trauma. Have we any parallel of such a condition? Yes, we have. We have the well-known condition of hematocele involving the tunica vaginalis. We have a series of cases following injury of the tunica vaginalis in whch immediately after the trauma there is a slight hemorrhage. This hemorrhage is not absorbed. Within a few weeks there is another slight hemorrhage, which is not absorbed. Within a short time there may be another hemorrhage, and finally we have a considerable accumulation of blood and serum within the tunica vaginalis, started by the original trauma, but being in fact a traumatic inflammation of the tunica vaginalis and not purely a simple hemorrhage alone. I am quite impressed with the possibility that in those cases where we find eight months after a head injury, or fifty-two days thereafter, we have pathologically a very similar condition in pachymeningitis hemorrhagica externa of traumatic origin to the hematocele which we have in the tunica vaginalis. Sometimes where we have very definite evidence of hemorrhage apparently from the middle meningeal artery, when we come to

operate and expose the dura, we do not find the hemorrhage is from the middle meningeal. I relate one such case in point.

Dr. S. C. Plummer: If the hemorrhage were extradural, it would, in all probability, be from a vessel so large that the symptoms would have appeared at an earlier date than fourteen days. Moreover, if the late symptoms were not due to the hemorrhage primarily, but to the fluid which was poured out as the result of irritation from the hemorrhage, we would think theoretically that the conditions outside of the dura would not be favorable for such a pathologic process; consequently, it only seems natural that in these cases where the symptoms came on so late, the lesion was invariably found in the dura instead of outside of it. There is one condition which may be confused with subdural hemorrhage coming on late or showing symptoms at a late period, and that is what Bollinger has described as a late apoplexy. He claims that after a contusion of the brain, a degeneration of brain substance may take place which may extend far beyond the limits of the original lesion. I recall one case which I thought came under this head. A man was struck in the temporal region in a railroad wreck; he received a slight wound, which was one-half or three-quarters of an inch in length. It divided a branch of the superficial temporal artery, which had to be ligated. This wound healed promptly. Ten days afterward, while at his desk, he was suddenly attacked with what seemed to be cerebral apoplexy. He had all the symptoms of hemiplegia. He never recovered entirely from this attack, although he made practically a perfect recovery, so far as the control of the muscles was concerned. The cerebral symptoms never disappeared entirely, There was always slowness of his mental processes, and one symptom, which was quite unusual, was excessive secretion from the parotid gland on the side opposite to the superficial lesion which he had. This was first noticed some weeks after the hemiplegia appeared, and persisted as long as he lived, which was two and a half years after the injury, and what he complained of more than anything else was an excessive flow of saliva.

Dr. Hugh T. Patrick:—I have not seen any cases of the particular type described by Dr. Allen. I can recall some cases where the symptoms began a considerable time after traumatism of the head, but cases with distinct symptoms of compression, with hemiplegia or distinct local paralysis, I have not seen. One thing that struck me in the table presented is that most of the typical cases, as indicated by the table, as well as in two perfectly similar cases reported by Allen of Philadelphia, have been in patients well along in years. The cerebral circulation in people advanced in years is sometimes a fearfully and wonderfully managed affair, and it seems to me more reasonable that this sort of thing would be more likely to happen in those advanced in age, and I do not know that I can explain it. In operating on brain cases, Walton of Boston says it is much safer, if there are localizing signs, to follow these localizing signs in looking for the lesion and not the point where the injury was received. I think that is about as good gospel as anyone could have in operating on the head. Of course, there are some signs, which look to be localizing signs, which are not of any focal value. For instance, paralysis of the sixth nerve is of little or no localizing value, although it is a localized trouble. But there are cerebral localizing signs which are more valuable in locating the place where the trouble is than is the point where the external violence was received. Rigidity on the affected side is a characteristic thing, not only in cerebral injury, when it occurs on the paralyzed side, but is indicative of a surface lesion. It is not found frequently in deep hemorrhage or in ordinary cerebral apoplexy.

Dr. Archibald Church:—As Dr. Bevan has pertinently suggested, in some of these cases it is not unlikely the operators were dealing with a pachymeningitis hemorrhagica, which is particularly common among men of the third, fourth and fifth decades of life, especially if they are alcoholic in their habits, and those cases in which we find laminated clots, or more or less organized layers of blood within the skull, or within the dura particularly, are manifested in their clinical phase by advancement and recession of symptoms, so that we may have at the end of a period of ten days or two weeks, or even a later date, some advance-

ment in paralytic manifestations or convulsions or rigidities, that would be connected with perhaps a slow traumatism or serious head injury. The dictum that we should be guided by the cerebral symptoms in exploration of the skull contents, with perhaps a comparative disregard of the external evidences of injury, is not always a safe rule. About two months ago there was admitted to St. Luke's Hospital a man accustomed to drinking heavily, and after being on a spree for a number of hours, he was seen late one Saturday night staggering down the street and seen to fall. He was brought into the hospital by the police, and they at first got the idea he had been slugged, but witnesses who saw him staggering along the street and fall were interrogated and said there was no hold-up about it. In the fall he received a wound over the left eye which caused a slight contusion. There was a distinct gash through the eyebrow, and he, as a result of the fall, or after they came to him, was in a peculiarly apathetic sort of condition. On the next day it was found that the left side of his body was paralyzed or lacking in its functional control. He staggered and dragged the left leg and used the left arm with uncertainty. He talked and was very much confused. He would sink into a comatose state and then brighten up. In one of these comatose conditions he brightened up to such an extent that an operation, which had been advised and planned, was postponed. When he became comatose again and showed Cheyne-Stokes respiration, an operation was done on the brain corresponding to the symptoms, but nothing was found beneath the dura. The convolutions and pit looked edematous. The man brightened up after the operation, but gradually relapsed into a comatose condition which deepened until finally he died without regaining consciousness. This last period of coma was due to the operation in part.

Upon postmortem examination, which was done, on the left temporal side under the location of the injury there was a hemorrhage, not a massive one, but one which seriously depressed the contour of the frontal lobe. If the operation had been done at this site on which the man had the local wound, perhaps his life might have been saved, so that, as a rule, we should not only operate on the side indicated by the nervous symptoms, but also operate upon the side which has evidently received the violence. Bullard and Munro of Boston have shown that most comatose conditions associated with cerebral concussion or injuries of the brain are produced by concussing agencies, and the coma which occurs in cerebral hemorrhage is due to a disturbance of the osmotic situation in the cranium. A disturbance vascularly throughout the entire brain substance is really the essential organic fact in the development of intracranial tension, which, of course, to a certain extent, is curative if it is reduced to such a degree as to stop persistent hemorrhage. I believe that in most of these cases where fluid contents are found in meningeally located clots, or in this particular situation, the variety of symptoms presented is secondary to a new osmotic situation which is developed in the course of time by agencies with which we are not entirely familiar.

Dr. Allen (closing):—In connection with the remarks of Dr. Church, I will say that Case 26 was one of injury on one side of the brain; there was hemorrhage on one side, and the symptoms were upon the same side. The patient was operated upon the opposite side, and postmortem examination revealed the fact that the fibers did not cross over. Several similar cases are reported.

CHICAGO MEDICAL SOCIETY.

Regular Meeting, held May 12, 1909.

A regular meeting was held May 12, 1909, with Dr. R. R. Ferguson in the Chair. "The Subinvoluted Uterus," by Richard R. Smith, Grand Rapids, Mich. Discussed by R. T. Gillmore, C. E. Paddock, a member, and R. R. Smith. "A Proposed Adjunct to the Present Plan of Sewage Disposal in the Sanitary District of Chicago," by Sanger Brown. Discussed by R. R. McCormick, John W. Alvord, E. O. Jordan, Arthur Lederer and Sanger Brown. Adjourned.

DISCUSSION ON THE PAPER OF DR. SMITH.

Dr. Robert T. Gillmore:—This is probably one of the most important factors in the invalidism of women after childbirth. The thorough comprehension of subinvolution embraces the consideration not only of subinvolution of the pelvic organs, but of the abdominal walls, abdominal organs, blood vessels and nervous system incident to pregnancy and the puerperal condition. Subinvolution is a pathologic condition, an arrest of normal involution, of which we know little, but we have come to the conclusion that it is probably not a degenerative change, but a chemical change, an autolysis. The etiology of cases of infection, laceration of the cervix and retention of the placenta or decidua should be considered not from the question of the ultimate treatment, but rather from that of prevention of these conditions. Obstetrics has not been given the weight it deserves, because even a normal delivery is a most serious condition.

In regard to prophylaxis: We must first consider infection, which can not be avoided even by those who practice aseptic midwifery. Asepsis can not always be secured, even though we are particularly careful about sterilization, because infection may be present in the genital tract somewhere. Then, when we consider the immediate repair of injuries, we must take into account the treatment of the patient while she is in bed. Involution is not a matter of weeks, but of months. The organs do not return to their normal condition inside of ten days, the time the patient usually is kept in bed, but involute for three months, and, as Dr. Smith said, the process may require years; in fact, the organs may never return to their normal condition.

As to treatment during the puerperium: Besides having the patient assume the postural position, she should be made to lie on her side or abdomen for five or six days, then assume the knee-chest position. We must ascertain that the organs are involuting properly, and if not, we must consider all the other postures the patient can take to prevent the possibility of injury.

As to the symptoms: There are hemorrhages lasting for a week or two, discharges lasting for several weeks, and on getting up out of bed the patient has backache, bearing-down sensations, etc., and on examination one finds an enlarged uterus with a patulous cervix and more or less hemorrhage from the vaginal tract. These points should be noted and not passed by lightly.

In regard to hysterectomy for these conditions after they have become chronic, I presume that after the patient has reached the menopause a hysterectomy is justifiable, but while childbirth is possible, hysterectomy should not be considered.

Dr. Charles E. Paddock:—Subinvolution is a condition which I believe can be prevented in a vast majority of cases, and the treatment should begin early before the termination of labor. Our aim should always be to bring the patient through her pregnancy in a healthy condition, and to do this a careful attention on the part of the physician to the hygiene of the pregnant woman is absolutely necessary. By such treatment we are taking an important step in the prevention of subinvolution of the uterus. The better the health of the woman when she arrives at term the less liability is there to inertia of the uterus.

Firm contraction and retraction of the muscle fibers produces an atrophy of the uterus by shutting off its blood supply, and any artificial means which will aid in this process hastens involution of that organ. The following should be along the line of treatment:

1. Watch every pregnant woman as you would a sick patient and let her arrive at term in a normal healthy state.

2. Recognize malpositions of the fetus and prevent inertia uteri.

3. Treat the third stage of labor by the Credé method with a tendency toward watchful expectancy.

4. Repair all lacerations of vagina and vulvar orifice.

5. Ten days or two weeks should be the time that the patient be in bed after delivery. Rarely less time than this and frequently longer. During this time, commencing about the seventh day, a general massage should be given daily and light exercise with arms and legs begun. At the tenth or twelfth day the uterus

should be level with the symphysis and the lochia should be white with very little discoloration.

6. Give ergot immediately after labor and continue its use in moderate doses for forty-eight hours, if necessary.

7. Put the babe to the breast at regular intervals.

My experience is limited in those cases of subinvolution existing near the menopause. I believe, however, that most of them are chronic conditions due to neglect in former labors.

Hemorrhage continuing four or five weeks after delivery usually means that involution is not taking place in a normal way, and the exploration of the interior of the uterus and probably a curettement is indicated.

A Member:—Posture is the thing in the prevention of subinvolution. Massage is entirely out of place. After two or three days the patient should be allowed to roll around in bed, thus favoring contraction of the uterus. A little medical stimulation sometimes is not out of place, but massage certainly is. Having failed to secure subinvolution, what shall be done? It is here that Dr. Smith advocates his radical procedure, and I agree with him in that.

Dr. Smith (closing):—In reference to the matter of hysterectomy, I would again say that this procedure is rarely applicable to younger women, but rather only to those who have borne their children, are nearing the climacteric, or are beyond it. I think we as a profession have been too conservative in allowing such patients to continue suffering year after year when it is in our power to give them relief. Each case must, however, be considered individually.

DISCUSSION ON PAPER OF DR. SANGER BROWN.

Mr. R. R. McCormick:—The suggestion of a separate septic tank for each house is a new one, and if the scheme proves successful, great credit will come to its author. It is clear that we must consider such suggestions as these. The people who legislated in Chicago in 1889 legislated with the idea that the time when Chicago would have a population of 3,000,000 was so far off that it need not be considered. Under the law 20,000 cubic feet of water per minute for each 100,000 population must flow. The drainage canal was designed to carry 600,000 feet, thus providing for a population of 3,000,000. By mistake the canal was built bigger than intended, and therefore can carry water for more than 3,000,000 people. The government says that inasmuch as it was planned to provide for only 3,000,000, that is all the canal will be allowed to provide for, no matter how great its capacity. We are contesting this point in the courts now, because when Chicago has a population of more than 3,000,000, the entire capacity of the canal must be used unless some such assistance as is suggested by Dr. Brown is invoked. Irrespective of the relative merits of different methods of disposing of sewage, we must look for help outside of the dilution method by some means of artificial purification of sewage.

This matter has been recognized by the board for about one year. It has been trying to decide what to do, by consulting men of experience and by original research. Some lawyers say that the Sanitary District had no right to consider sewage disposal except by dilution, but we have gone on with our experiments and are now installing a testing plant where we are going to have septic tanks and settling basins, sprinklers and filters, as advocated by Dr. Dunbar. It is my hope that this testing laboratory can be continued forever, and yield information that can be used by the community for all time.

As to the final method to be employed, to take care of the drainage and to help out the canal, whether the septic tank for each house or tanks for large areas or rock filters, I am not prepared to advance any theory of my own.

There is a fundamental fault in the construction of the legal entity of the sanitary district. The drainage board is an elective body, and in the very nature of things we do not elect the most scientific men along this line. The nine members of the board are men of good intention, but without any special training in bacteriology or civil engineering. It is my hope to evolve a plan whereby

we can get volunteers, trained men who will advise with our bacteriologists and engineers, to the end of increasing the knowledge and value of the science of sanitary engineering.

I want to call attention to the enormous and constantly increasing cost of municipal government. A few years ago we considered paved streets a luxury. Now they are universal. Twenty years ago we passed the drianage canal act, the public believing that $20,000,000 would take care of sewage disposal forever. The expenditure to date has been $60,000,000, and to complete the canal $10,000,000 more will be required. We recognize that we must go into the disposal of sewage other than by the canal. That means more money. Before long you will say that Michigan water is good, but not good enough unless it is filtered. The question is, where are we going to get all this money? If we get it by taxation, we are going to revolutionize tne entire basis on which business is conducted. Personal property in the form of bonds will be taken away from us. We now have a tax rate of two-thirds of 1 per cent., which is not so serious on a 4 per cent. bond, but if you allow the tax rate to go up to 2 per cent., where will the holder of a 4 per cent. bond come in? Therefore, we must consider some means of keeping down the cost as much as possible. It is with this idea that the board has been doing certain things which have evoked considerable criticism, such as developing the dockage along the canal, into which we have gone extensively; also the development of electric power, using the water used for purifying the sewage over again and converting it into marketable electric energy. As we go on into municipal development, there will be a constantly increasing expense that can not be avoided and it will be necessary for the public to devise methods which will create revenues to counteract that great cost.

Mr. John W. Alvord (Sanitary Engineer):—It may be of interest to the medical profession to know something of the extent to which sewage purification has become a practical art. This will be more fully realized when it is stated that about one-half of the sewage of England is purified at the present time by artificial methods. In this country there are at least several hundred municipalities in which sewage is artificially purified to a greater or less extent. The art of purification was early necessitated in rural residences, and institutions located in the country, so that it may be said that the majority of these large institutions not located within reach of city sewage have provided themselves with artificial purification of their domestic wastes. The suggestion for residential septic tanks in Chicago, by Dr. Brown, is not, therefore, wholly novel or unpracticed, although it may seem so to residents of Chicago who are not perhaps informed on this particular subject. It is interesting to mention that in Chicago we have perhaps as many as 100,000 tanks that have to be provided for our dwellings, by reason of the city's plumbing ordinances, which may fairly be said to approximate the septic tank in their action. I refer to the so-called house catch-basin, in which the waste waters from the kitchen sink, the bathtub and the laundry are intercepted, so that the grease and organic matter from these waste waters does not pass directly into the sewers. Such tanks retain these organic substances, and if left undisturbed largely dissolve them by bacterial action in due course of time.

There are objections to a universal adoption of residential tanks in a large city, such as has been suggested by Dr. Brown, but from a scientific point of view they are rather economic and sentimental than scientific. The question would be raised, for instance, as to whether it is more economical for the householder to provide an individual septic tank for the reduction of the organic matters of his house waste, or whether it would be more economical for the municipality to care for such wastes, either wholly or in part. Present practice inclines to the belief that this is best done by the municipality.

I am often asked what a septic tank is. Sanitarians have had some difficulty in uniting on the difference between a septic tank and a sedimenting tank in which bacterial action is actively progressing. But the courts have held that a septic tank is one in which organic wastes are dissolved by the action of anaerobic bacteria to such an extent *that none* of the organic suspended matter escapes from the tank. This, they say, is accomplished by the slow flow of the polluted

liquid through the tank, also by the surface scum which forms a roof over the contained liquid, excluding light and air. Proper septic action is also evidenced by the lack of dissolved oxygen in the effluents of such tanks,, and by non-disturbance from cleaning or other agitation. It may be said, in passing, that many tanks which produce effluent comparatively free from suspended matter might not correspond with this somewhat dogmatic definition, but we must legally conclude that where this is the case, such tanks are sedimentation tanks, or sewage reduction tanks, not completely septic.

The use of septic or other sewage tanks used in sewage purification has been necessitated by the desirability of first reducing the organic solids contained to impurities in fine suspension or solution, so that filters commonly used as a second stage would not become clogged with these matters. The discovery that by bringing the sewage into a state of comparative rest and holding it definite intervals under proper conditions, we may expect a more or less complete dissolution of the solids, has an important step in the art. Bacteria, multiplying rapidly under such conditions, act in a way which, although not fully understood, is none the less quite effective. The solids are largely reduced into inoffensive gases, such as methane or marsh gas and dilute carbonic acid gas. Such tanks have also become useful by reason of the fact that they are a comparatively odorless method of reducing the solids. To the past generation of sanitarians offensive odors were considered a cause of disease, and as a legacy from this idea there is a proper and popular aversion to the decomposition of solids in such a way as to produce such odors. In the septic or reduction tank we may have decomposition going on, but in a comparatively odorless manner which results only in the production of such gases as are not particularly offensive.

The resulting effluent from septic or reduction tanks can be readily filtered in what might be called the second stage of sewage purification; that is, either by intermittent filtration through prepared sand beds, or by sprinkling on beds of broken stone, or by irrigating upon porous soils, the principle in either case being the same. Sewage purification is, therefore, now a well-established and successful art, which can be relied upon with confidence to do away with the ugly problems produced by wastes from isolated dwellings or congested populations. By the utilization of bacterial principles, the art has become economical and effective, where before, ten years or so ago, it was burdensome, expensive, and disagreeable. Finally, I may say that to me the utilization of micro-organism in the rapid and harmless reduction of organic matter in the liquid wastes from large cities is as wonderful a step in scientific progress in the recent past as are the *x*-rays, wireless telegraphy, or antiseptic surgery. All alike are long advances into the wonderful secrets of a fathomless natural order and law.

Dr. Edwin O. Jordan:—I would like to endorse very heartily the central feature of Dr. Brown's paper, namely, the necessity for experimentation along the line of sewage disposal. Two chief points must be considered in this connection; first, the relation of sewage to the public health; second, the creation of a nuisance through the decomposition of the organic matter contained in the sewage. As regards the first point, we have in this city in large measure solved that problem, for the present at all events, by the discharge of the bulk of Chicago sewage into the Desplaines and Illinois Valleys, thus in great part removing the possibility of contamination of our drinking-water with sewage. As regards the possible danger to the health of the people of St. Louis, the Supreme Court of the United States has decided that they have nothing to fear, so that at the present time the public health side of the sewage disposal question may be said to be in a fairly satisfactory condition.

The second point, the decomposition of organic matter, is not on quite the same footing. We are discharging larger and larger quantities of organic matter into the drainage canal, and the time is soon coming when the decomposition of this matter is likely to prove a serious nuisance in the neighborhood of Chicago.

There remains also to be solved the problem of the disposal of sewage of nearby communities. South of Eighty-seventh Street much sewage still goes

into the Lake. There is danger to public health there. This problem must be met by the sanitary district in the near future.

The whole question of the prevention of nuisance from decomposition of organic matter is at present in a very unsettled and uncertain condition. Dunbar's book on Sewage Disposal is one of the latest and most authoritative contributions on this subject. In this Dr. Dunbar states that he hesitated for a long time before publishing the data he had secured, because he felt that these facts only permitted of tentative and temporary conclusions.

Take, for example, the question of the amount of organic matter destroyed in septic tanks through the agency of bacteria. There is the greatest difference of opinion on that point. Under some conditions as much as fifty or sixty per cent. of suspended organic matter may be destroyed in a septic tank. Other experiments indicate that not more than twenty-five per cent. of organic matter is destroyed, and Mr. Clark, of the Massachusetts State Board of Health, says that in some places in England, only ten per cent. of organic matter is destroyed in septic tanks. This indicates the great divergence in experimental data, and emphasizes the necessity of further investigation of the whole problem of sewage disposal. We are very much to be congratulated that the Trustees of the Sanitary District are about to take up in a broad way and under scientific auspices the study of this very essential question.

Dr. A. W. Lederer:—The only trouble in this connection is that septic tanks cannot be built properly here. Some tanks remove as much as eighty-five per cent. of organic matter, while others remove none at all. I do not believe that septic tanks could be installed properly in every house, but they can be, on a large scale, by a municipality or sanitary district. The septic tanks in Lake Forest and in Champaign are doing excellent work, but prove that this work must be under the supervision of competent engineers.

Dr. Brown (closing):—In my paper I explained why I thought the individual tank might be made to do better work than a municipal tank. There is no reason why a small tank, which is of interest to the householder and under his supervision, as well as that of a well-trained municipal inspector, is not in better condition to do the work than any other sort of tank. As far as the construction of the tank is concerned, it is absurd to say that the individual tank cannot be built as well as the larger tank. We have the same conditions to meet in both, but on a smaller scale in the house tank than in the municipal tank. However, the main point in my paper is that something must be done, and the public has a right to look to the medical profession to move first in the matter. After hearing Mr. McCormick speak, I think we may feel assured that the matter is in competent hands, and is being diligently and intelligently worked out, but we must create public sentiment. We have been too lax. It is a subject we do not like to get close to, but we must meet this question of sewage disposal. In New York they have reached the limit in putting sewage into the harbor and must devise other means of disposal. In Columbus experiments with the septic tank were carried on for a number of years, but proved unsatisfactory or inconclusive because they had no means of controlling the character and quantity of the inflow. I believe the method I have suggested will give satisfaction from every point of view. I have operated a septic tank as described for four years for eighty people. I have succeeded in getting a uniform flow and the result has been a most satisfactory one, though I have made no analyses.

I think it is premature to enter into the discussion as to which is the better method, whether to collect the sewage from a certain locality and have it treated in collective tanks or whether it is better to have a house tank. The first thing to determine is under what conditions the tank will do the best work, and whether we can get along without filtration or not.

SOUTH SIDE BRANCH

The South Side Branch of the Chicago Medical Society held a most successful ladies' night banquet at the Lexington hotel, Saturday night, June 26. The attendance was about 150. Addresses were made by President of the Branch

Dr. E. B. Tuteur. Responses were made by the President-elect, William Fuller, and President-elect of the Chicago Medical Society John A. Robison.

Dr. Tuteur briefly reviewed the work of the branch during his incumbency. The scientific programs had created much interest and discussion. Much original work had been brought out. The attendance at the meetings had been more than doubled. This was the first ladies' night banquet given by the profession of the South Side. He hoped that the spirit of the evening would not be lost, but that functions of this character would promote true fellowship between physicians, their wives and families.

Dr. Fuller dwelt on the necessity of standing together and working for better and greater things, for scientific progress through individual effort, and pleaded for the united support of the members of the branch.

Dr. Robison spoke of the necessity for loyalty to the central society by the branches and discountenanced the idea that some had that the branches should consider themselves separate and distinct from the parent society.

The declamations, music and vaudeville performance furnished for the entertainment of the guests were very high class and were thoroughly enjoyed by all present.

CHICAGO SURGICAL SOCIETY.

Regular Meeting, March 5, 1909.

A regular meeting was held March 5, 1909, with the president, Dr. A. E. Halstead, in the chair.

ENTEROLITHS AS A CAUSE OF INTESTINAL OBSTRUCTION.

Dr. D. W. Graham exhibited a specimen taken from the jejunum of a woman 69 years of age. It was oblong in shape and tapered at what was the upper end as it lay in the intestine. It originally measured something over 2½ inches in length and 1¾ inches in diameter. The small end was quite brittle and crumbled easily, indicating a recent formation. The stone was sawed in two so as to show the structure. The nucleus was plainly seen, was one-third of an inch in diameter, was situated three-quarters of the long diameter from the upper smaller end, and showed on analysis to be a gall-stone. He gave a detailed account of the clinical picture presented by this patient.

ECHINOCOCCUS CYST OF THE KIDNEY.

Dr. Graham reported next a case of echinococcus cyst of the kidney. He had seen but this one case. Patient had been confined two weeks before he saw her; labor had been normal, but shortly after confinement she had a high fever, which was thought to be puerperal. Examination revealed a large fluctuating mass on the right side, extending from the hypochondrium down to the crest of the ilium, filling one-half of the abdomen. Some of the white bodies passed with the urine. These proved to be small hydatid cysts, and gave a clew as to the nature of the abdominal mass. They were as large as the end of the little finger. She passed more of them, some of them being broken, after entering the hospital. It seemed incredible to him that such bodies could pass through the ureter, yet they did so pass, and he had found the same phenomenon had been referred to by a few writers. As all the symptoms, both local and general, indicated suppuration, he incised the mass in the loin, and a great number of daughter cysts came out with the free flow of pus. No effort was made to remove the cyst. Another feature was that the anterior wall of the large sac was calcified, so that it crackled on pressure. Nothing more than free drainage was attempted. This however, made but little improvement in the patient's already profoundly septic condition, and she died ten days later.

DISCUSSION.

Dr. D. A. K. Steele narrated an almost identical experience to the one mentioned by Dr. Graham some fourteen years ago. The patient, a woman, had intermittent attacks of intestinal obstruction which lasted for two or three days, then followed

by vomiting. It was a case of acute intestinal obstruction in which he opened the abdomen and found the concretion as large as a hen's egg, a so-called enterolith. It was formed in the same way with these concentric additions to the central stone or gallstone. This lay like a ball-valve at the ileocecal valve or junction where the ileum passes into the cecum, and he thought the narrow portion of the ileum there caused the obstruction to the passage of the enterolith. It was readily removed through a short incision.

Dr. Dean Lewis presented a paper on "Pathology of Goiter," which was illustrated with numerous stereopticon slides.

THE SURGICAL CONSIDERATIONS OF GOITER.

Dr. D. A. K. Steele read a paper on this subject in which he referred to the histology of goiter, and spoke of simple colloid hypertrophy, adenoma, adenoma with cystic degeneration, and exophthalmic varieties, after which he discussed the surgical treatment. Total removal of the gland is no longer done except in case of carcinoma, as it is followed by myxedema in 70 per cent. of the cases. Removal or injury of the parathyroids should be avoided on account of the danger of tetany developing. By preserving the posterior capsule and leaving one-fifth of the gland we are safe from these dangers. Care to avoid injury of the recurrent laryngeal nerve when tying the inferior thyroid artery is necessary, and led Kocher to use cocain anesthesia. Deaths occasionally occur from shock, hemorrhage, pneumonia, infections, myxedema and tetany, in spite of the greatest care on the part of the surgeon.

DISCUSSION.

Dr. M. L. Harris divided the cases into two classes, and he thought the method of procedure is quite different. First, into those of ordinary goiters, such as the adenomas and colloid goiters, and all varieties of goiter except exophthalmic goiter. In the colloid goiters his method was enucleation. In these cases one could enucleate the diseased part of the gland and leave the healthy part. By the enucleation method one was able to save all of the function of the gland on either side. In the exophthalmic variety one should avoid the gland and never get into it. Therefore, he should separate outside of the gland until he got to the posterior part. One should avoid getting into the gland because of wishing to avoid scattering the gland material, and thus preventing its absorption and the production of hyperthyroidism which causes death in these patients after these operations. In the exophthalmic variety, after exposing the gland and getting down to the capsule, he proceeds to ligate the vessels. Usually, great difficulty is experienced in dealing with the superior thyroid. In pulling down the upper corner of the lobe we stretch and draw on the superior thyroid vessels, and when the lobe projects upward and well backward, we find, when we have drawn it down, that we have put the vessels on considerable tension, and there is danger of the vessel escaping from the ligature or clamp, with excessive hemorrhage. After the superior vessels are ligated it loosens up the gland and allows it to be displaced forward, and then we proceed to ligate the inferior artery. He never ligated this vessel in continuity of the main artery, but it should always be ligated inside of the capsule after the vessel has subdivided into its branches. He has never been able to determine just how much of the gland to remove. We remove a certain portion of the gland, but if we do not remove quite enough the patient will not be cured.

Dr. Daniel N. Eisendrath emphasized the importance of ligating the superior thyroid artery. In large goiters of long standing we are confronted by a trachea which is pathological. It is pushed over to one side. In either case it is pushed backward or deeper, so that a considerable part of the rings of the trachea may be atrophied, and not infrequently there is asphyxiation following the removal of large goiters.

Dr. D. W. Graham said he had never operated on a case of goiter under local anesthesia, and would feel averse to trying it. He knew he could do better, quicker and safer work under general anesthesia. He had found the greatest trouble with the small goiters. He was never much concerned about accidents

and complications in large goiter, but he was in small ones that did not stand out much. They were always larger and deeper than they looked to be.

Dr. Steele, in closing, said that in all cases of exophthalmic goiter that failed to show continued improvement under medical and other treatment, a partial thyroidectomy should be done.

Regular Meeting, April 2, 1909.

A regular meeting was held April 2, 1909, with the president, Dr. A. E. Halstead, in the chair.

SOME OF THE PRINCIPLES OF INTESTINAL SUTURING.

Dr. F. Gregory Connell, of Oshkosh, Wisconsin, read a paper on this subject. The points which the author considered concerned chiefly the technical phase of intestinal suturing. Innumerable other conditions, he said, would be met with before, during and after operation, that would demand deep study. A knowledge as to these points, and the ability to arrive promptly at the correct decision was of equal importance with technical skill, for the reason that a false step or conclusion regarding any one of them might render futile a technically perfect enterorrhaphy. Such knowledge demanded a high degree of something called surgical judgment, which could only be acquired after extensive experience, founded upon a comprehensive understanding of pathology in all its branches. And it was just this surgical judgment that elevated the intestinal surgeon above a mere tailor of human tissue.

DISCUSSION.

Dr. John E. Owens said he had used the ordinary suture with a good deal of satisfaction, but not the through and through suture. He was very glad to hear from Dr. Connell that this was a safe suture to use. It was certainly a method which strongly maintained the ends in approximation without any great risk.

Dr. Jacob Frank said that the essayist claimed for the diaphragm a purpose with which he could not agree. When the suture method first came out this diaphragm was considered a bad thing and I was against suturing. Now, Dr. Connell thought it prevented infection. He disagreed with him in that respect. The speaker's experience with the suture method had been mainly in side to side anastomosis; that the diaphragm in a dog, whose intestines were not completely emptied, the fecal current would go against the diaphragm and often stop there, and if there happened to be a piece of bone in the dog's intestine there would be obstruction from that. He agreed that the Connell suture was a very good thing and was giving good results; but it was not an ideal method.

Dr. T. J. Watkins said he was very fond of the Connell suture. He thought the point made by the essayist in regard to the diaphragm was well taken, in that this diaphragm remained for a few hours until there was a plastic exudate at the seroserous approximation; then, after that the action of diaphragm in regard to protection or in regard to any danger could have but little importance. The diaphragm very soon atrophied or became necrotic.

Dr. A. E. Halstead remarked that two years ago last February he operated upon a case of obstruction due to cancer of the descending colon. The ileus was not due to the primary growth in the colon, but to an angularity of the small intestine produced by adhesions of a loop of intestines to the growth in the colon. Double resection was performed, the Connell suture being used to unite the divided ends of the intestine. The patient recovered, but later developed metastasis in the liver, and died a few days ago. An autopsy was made and the intestine examined. It was with difficulty that the site of the resection could be found. There was no sign of the diaphragm that had received so much attention; neither was there any constriction of the lumen of the intestine.

Dr. Connell, in closing, said that intestinal obstruction due to the diaphragm should never occur with properly placed stitches. There was a case on record in which a Murphy button was inserted above an enterorrhaphy, causing such a diaphragm, and the button passed uneventfully at the usual time.

KRAUROSIS, WITH REPORT OF A CASE.

Dr. Jacob Frank read a paper on this subject. He carefully reviewed the literature. The etiology was obscure. The disease was most common at or about the menopause, but might occur earlier or later. Cases from sixteen to seventy-two years were reported. The pathology and bacteriology of the disease were given. From fifty-two cases reported since 1875 the author concluded, with Reed, that kraurosis is a distinct disease. It is rare. It is essentially inflammatory and limited to the vulva. It is not syphilitic. It is probably trophic. Affected areas can be successfully excised.

Dr. Frank then detailed the operation he had performed in the case of a married woman, 28 years of age, with a gratifying result.

DISCUSSION.

Dr. T. J. Watkins had seen a number of cases where there was considerable pathology about the vulva, such as the essayist had described. One very noticeable case was where the ovaries were removed from a woman, about thirty-two years of age, which was followed by extreme atrophy. The atrophy was so extensive and contraction so great, that when she came under his observation the vaginal opening would hardly admit anything larger than a good sized lead pencil. All of the pathology that had been given and all of the sections that had been illustrated were found in infections of the vulva. The round-cell infiltration indicated very much that it was an infection. Another thing that pointed to the disease being an infection was the frequency of pruritis, the presence of an irritating discharge. Later on this pruritis might disappear as the atrophy continued and the nerve endings were destroyed.

Dr. Frank, in closing, said that, like Dr. Watkins, he thought before he saw this case this disease did not exist, but now he was convinced of its existence, although he did not clearly understand its pathology.

FULTON COUNTY.

The Fulton County Medical Society held its forty-eighth meeting in Dr. Shallenberger's office, Canton, Ill., July 6, 1909. The meeting was called to order by the first vice-president, Dr. F. C. Robb. The following members were present: Drs. Robb, Coleman, Putnam, Blackburn, Connelly, Oren, Stoops and Shallenberger. Dr. Stoops was appointed secretary pro tem. The society proceeded without the minutes of the previous meeting. The following were elected to membership: Drs. Jennie W. Parks, of Cuba; G. C. Black, of Table Grove; R. W. Harrod, of Avon; and C. N. Allison, of Canton. General discussions followed on the question of contract practice, but no action was taken, as it was considered best to postpone same to October meeting. Dr. Shallenberger, in discussing the attitude of representatives in misrepresenting the interests of the physicians at Springfield, suggested that the physicians of this district make a united effort to elect one of their profession as state senator and one as representative. Dr. Connelly moved that the October meeting be made a business meeting to settle the contract practice question and matters pertaining to the work of the legislative committee and that the secretary send special notice of this arrangement to each member of the society. On Dr. Coleman's second the motion was carried. Drs. Rogers and Barton not being present, Dr. Robb read a paper on "Infection." This was discussed by Drs. Stoops, Coleman and Robb. A motion that the society extend to Dr. Shallenberger its thanks for the use of his office as a meeting place and for cigars generously furnished was carried. A motion that the papers of Drs. Barton and Rogers be continued and presented at the December meeting was made by Drs. Shallenberger and Simmons. Carried. Dr. Shallenberger moved that the acting president, Dr. Robb, the acting secretary, Dr. Stoops, and the second vice-president, Dr. Coleman, be a program committee to arrange the program for the October and December meetings. Carried.

The committee reported the following program for the December meeting: Dr. J. S. Barton, "Veratrum Viride;" Dr. H. H. Rogers, "Substernal Abscess;" Dr. J. C. Simmons, "Pneumonia;" Dr. J. E. Coleman, "Gall Bladder Infection." Report was adopted. The meeting then adjourned.

P. H. STOOPS, Sec. Pro Tem.

LAKE COUNTY.

The meeting was held in the Town Hall at Grayslake, Illinois, on June 3, 1909. In the absence of the president of the Society, Dr. I. C. Foley, Dr. E. H. Ames of Antioch occupied the chair. This meeting was our annual meeting and we proceeded at once with the election of officers. The following officers were elected for the ensuing year: Dr. J. L. Taylor of Libertyville was elected president; Dr. E. H. Ames of Antioch, vice-president; Dr. W. H. Watterson of Waukegan, secretary. The following applications were then acted upon by the Board of Censors: Dr. Frederick H. Martin and Dr. A. H. Churchill, of Libertyville; Dr. W. N. Clark, of Grayslake; Dr. Martin E. Fuller, of Wauconda; Dr. Margaret Grant and Dr. J. F. Roemer, of Waukegan. The Board of Censors recommended for membership all the applicants except the last one, whose application could not be acted upon because he had scratched out the last clause of the application blank, therefore taking the matter out of the hands of the County Society to act on. On vote of the Society all of the above named doctors, except the last mentioned, were elected to membership of the Lake County Medical Society.

The report of the Society's efforts against the Osteopathic Bill, recently lost in the legislature, was then read. The program was then taken up and consisted of a paper by Dr. J. L. Taylor on Peritonitis. It was a most careful review of modern literature and personal experience with this subject. The papers by Dr. A. E. Brown on "Gastroenteritis" and F. M. Barker on "Infant Feeding" were not given on account of the absence of the writers. The paper on "Medical Ethics," by Dr. L. H. Tombaugh was a most excellent paper and gave a history of the subject, after which the Oath of Hippocrates was read. Then, "More Recent Work Done by Men and Societies" was spoken of and the actual purpose of the code for to-day was given. "Relations of the Patient," "Relations of the Doctor to the Public," "Pecuniary Relation," "Fees," "Fee Splitting," were all referred to and the paper ended up with a number of very good axioms that should be followed by every physician. The subject was freely discussed by several of the members present. The report of the State Medical meeting at Quincy was then read by our delegate, Dr. W. C. Bouton, and the subject of "The Cure of the Poor in Lake County" was then discussed and a committee consisting of Drs. Tombaugh, Bouton and Watterson was appointed to devise ways and means of placing the matter before the Board of Supervisors. The following doctors were present: Tombaugh, Bouton, Bellows, T. C. Brown, Holm, Clark, Ames, Taylor, Churchill, Martin, Fuller, Palmer, and Watterson. Meeting adjourned to meet in September.

MORGAN COUNTY.

Morgan County Medical Society met June 13, 1909, at Public Library, Jacksonville, Illinois, Dr. A. J. Ogram presiding. Dr. A. L. Adams reported a case of Bezold's Mastoiditis. Patient complained of pain for a week, no discharge. Edema along the sternocleidomastoid, tenderness, fever, and continuous pain. Head held in position to take off tension on affected side. Facial expression of acute suffering, membrane reddened. Incision of drum showed some bloody discharge but no pus, brought relief. On entering mastoid area at time, pus welled up. Cellulitis of neck had been produced by extension of infection from tip.

Dr. E. F. Leonard presented an interesting paper on "Dementia Præcox; Typical Cases, Treatment and Prognosis." In treatment much can be accom-

plished in the way of prophylaxis by intelligent child study on the part of the physician. He should be on the lookout for psychopathic personalities and should guide these through the throes of adolescence and our system of forced education. Wrong tendencies should be righted. Marriage of these personalities should not be encouraged. A nourishing, well-regulated diet, avoidance of stimulants, physical and psychic. Regular hours of exercise and plenty of rest and sleep. The out-of-door, simple life is to be recommended. Tonics, hydrotherapy, hot packs for agitated cases, cold stimulating douches and baths for those inclined to negativism and stupidity should be given.

As to prognosis of the different forms, the katatonic offers the best chance for recovery, then the hebephrenic and paranoid. Where more care can be given individual cases results are better. Correction of functional abnormalities, establishment of a regime of living with out door life and work, tend to postpone and diminish the characteristic deterioration process.

The discussion of Dr. Leonard's paper was led by Dr. E. L. Crouch.

GEORGE STACY, M.D., Secretary.

The Morgan County Medical Society met July 15, 1909, at Passavant Hospital for a clinical session.

Dr. Frank P. Norbury showed a case of transverse lesion of the cord at the level of the second lumbar vertebra. The original lesion was due to intramedullary hemorrhage.

Dr. T. O. Hardesty exhibited a patient with an extensive tubercular lesion of the ankle.

Dr. Carl E. Black demonstrated a case of peritoneal abscess from which about four gallons of pus had been evacuated and extensive multiple drainage established. The lower abdominal viscera in this case had been shoved by nature practically into one-quarter of the general abdominal cavity.

After the clinic, adjournment was taken to the Pacific hotel for luncheon.

Dr. Duncan R. Gillies and Dr. Ralph T. Hinton were elected to membership in the society at this session.

GEORGE STACY, M.D., Secretary.

TAZEWELL COUNTY.

At a meeting of the Tazewell County Medical Society, held at Morton, Ill., July 20, the following were elected to serve another year:

President—Dr. C. G. Muehlmann, Pekin.

Vice-President—E. F. Kelchner, Delavan.

Secretary—F. C. Gale, Pekin.

The next meeting will be held at Delavan, Ill., Oct. 12, 1909.

C. G. MUEHLMANN, President.

NEWS OF THE STATE

PERSONAL.

Dr. Joseph Robbins, Quincy, is still seriously ill in Blessing Hospital.

Dr. and Mrs. George Edwin Baxter of Chicago sailed for Europe July 24.

Dr. Albert J. Ochsner has been elected president of the Wisconsin University Alumni Association.

Dr. W. T. Stewart and wife of 978 Douglas boulevard are spending July and August near St. Joe, Mich.

Dr. and Mrs. E. Wyllys Andrews, Dr. and Mrs. Nathan S. Davis and family, Dr. Edmund J. Doering, and Dr. Edward Luehr have gone to Europe.

Dr. Anton G. Carlson has been appointed professor of physiology and Dr. H. Gideon Wells has been appointed professor of pathology in the University of Chicago.

Dr. George W. Boot, Evanston; Samuel M. Wylie, Paxton; John F. Page, Eureka; William B. Peck, Freeport, and Thomas H. Wagner, Joliet, have sailed for Europe.

NEWS ITEMS.

Dr. G. R. Cowan, of Normal and Girard, Ill., has located in Murphysboro, Tenn.

The Hospital Aid Society of Monmouth, at its session June 16, voted $1,000 to the building fund.

Dr. Arthur D. West, Moline, underwent an operation for appendicitis, July 19, at the City Hospital.

A. A. Mertz, a recent graduate of Ann Arbor, has accepted a position as interne at the Springfield Hospital.

Dr. R. Helmla, of Onarga, has returned from Vienna, where he did special surgical work in the General Hospital.

Dr. T. W. Bath, Bloomington, has been elected surgeon of the Department of Illinois, United Spanish War Veterans.

About $3,000 was cleared for the proposed Lake Forest Hospital for contagious disease at the annual horse show July 2-3.

Dr. J. R. Neal, Dr. W. S. Crowley and Dr. E. L. Barnard, recent graduates of Northwestern University, are practicing in Springfield.

Dr. Edward W. Stubbs, Aurora, physician of Kane County, was slightly injured and his carriage destroyed in a runaway accident in Aurora July 19.

Dr. Charles F. Barstow, Freeport, accused of having performed an illegal operation which caused the death of Miss Janette Reider, was declared not guilty by the jury.

Dr. W. W. Pearson, of Des Moines, Iowa, has been elected dean of the Medical Department of Drake University of Des Moines. Dr. Pearson lived for many years in Springfield, Ill.

Dr. W. R. Miller, of Crescent City, Ill., was arrested July 12 and taken to Kankakee County jail, charged with the murder of Mr. J. B. Saylor, vice-president of the First National Bank of Crescent City.

The new addition to St. Joseph's Hospital, Bloomington, recently erected at a cost of about $75,000, was opened for public inspection June 19-20. The addition includes about seventy rooms and wards.

Dr. E. A. Weimer, of Peoria, was recently fined $100 and costs in the U. S. Court by Judge Humphrey. Dr. Weimer is said to have annoyed a prominent Peoria woman with letters and postal cards sent through the mail.

The Jewish Consumptive Relief Society dedicated its building for female patients June 27. The building has been presented to the Chicago Winfield Tuberculosis Sanatorium and will accommodate 10 patients.

Dr. M. W. Thompson was recently sued in the Superior Court of Chicago by Lillie Bell for $25,000, who alleged injuries as a result of conditions following the setting of a bone in her leg in such a way that she became lame.

Dr. Joseph Favil Biehn was suspended from the position of director of the laboratories of the health department of Chicago on July 31 by Health Commissioner W. A. Evans, pending the filing of charges before the civil service commission.

Dr. Byron Robinson has started suit for damages against Dr. Clara Scippel, claiming that she circulated a libel against him. Dr. Scippel declared that, as an attending physician of the Mary Thompson Hospital, she protested to the board of managers against the appointment of Dr. Robinson on the consulting staff.

Dr. M. D. Foster, of Olney, one of the few physicians in the national House of Representatives, recently introduced a resolution creating a standing house committee to be known as the Committee on Public Health and National Quarantine to be composed of fifteen members. He would have all legislation representing public health and federal quarantine referred to this body in the future.

The new scheme of house numbering in Chicago will be in effect under the ordinance September 1. With the exception of the business district north of Twelfth Street and east of the river, houses on all streets crossing Madison Street or Madison Street extended will be numbered from Madison Street, 800 to the mile, and be called North and South. Streets crossing State Street or State Street extended will receive numbers beginning at State Street, 800 to the mile, and be named East

and West. Where streets only theoretically cross the extensions of Madison and State streets in the lake, the designations South and West are unnecessary. The city address of THE JOURNAL will be changed from 1916 to 4603 Evanston Avenue.

PUBLIC HEALTH.

The Department of Health of Chicago has issued an illustrated poster entitled "Speaking of Flies," the text of which is four-fold and is as follows:

"Don't allow flies in your house."
"Don't permit them near your food, especially milk."
"Don't buy foodstuff where flies are tolerated."
"Don't eat where food has been exposed to flies."

The six Chicago women inspectors of the health department were put into uniform by a special ordinance of the City Council. It consists of a dark blue suit, black straw hat in summer and felt in winter, relieved by a single feather. A short jacket is worn in cool weather, and a white shirt waist in summer. The handsome red-cross star completes an attractive costume.

The Board of Health of Springfield in June published a monthly bulletin which includes not only the state of mortality as previously published but sanitary suggestions which ought to prove a valuable addition. The *Springfield News*, June 10, has the following to say regarding the innovation: "Springfield people are commenting favorably upon the plan of Dr. Palmer to issue a monthly health *Bulletin*, the first number of which appeared yesterday. The *Bulletin* will keep the public fully informed as to the sanitary conditions of the city and will contain the doctor's recommendations for improvement. It will be much broader in its scope than the "Statement of Mortality" of former superintendents of the health department, its purpose being to educate the people in the matter of healthful living as well as to tell them how many deaths have occurred from certain causes during the month. If bad conditions exist in certain parts of the city, the *Bulletin* will advise the citizens of the best and quickest way to remedy the evil. In every way Dr. Palmer will seek to safeguard the health of the city and to encourage the public to assume its share of the responsibility.

For the first time in many years Springfield has a physician, instead of a politician, at the head of its health department, and the city is to be congratulated upon the innovation. A doctor, better than one from any other profession or calling, is competent to do the work of this important department, and what he has to tell the people from month to month may be accepted by the people as coming from one of authority. The public should cooperate with the doctor in all his endeavors. His recommendations will be worthy of consideration and his advice the kind that should be followed."

According to the *Bulletin* of July 24, "The city of Chicago is to be congratulated upon the outcome of the recent, more rational Fourth of July celebration.

Three weeks have now elapsed and we can safely conclude as to the effects of this variety of observance.

There has been but one death from tetanus during the last three weeks and that was not due to a Fourth accident. Last year in the same time there were four.

This saving is due to three factors:

First—The use of safer explosives.

Second—The lessened use of explosives.

Third—The freer use of tetanus antitoxin as a preventive measure.

We have not been able to trace a single death directly to explosives used on this occasion. The two Chicago deaths carried in the Chicago papers are but remotely connected with explosives. One was due to a runaway, in which the horse had been frightened by a cracker. The other was caused by an engine running to a fire caused by an explosive.

The police should be thanked, the people congratulated."

A fourth building was added to the plant of the Chicago-Winfield Tuberculosis Sanitarium at Winfield, Ill., as the result of a gift of $5,000 from Mrs. Amanuel Mandel.

Officers were elected for the year as follows: Charles A. Stonehill, president; Mrs. Emma B. Mandl, vice-president; David M. Pfaelzer, treasurer; Mrs. B. M. Englehard, recording secretary; Mrs. M. L. Aren, corresponding secretary; Max Lindauer, financial secretary.

Evanston has received a fund of $585, to be known as the Kate Lord Memorial Fund, the income of which is to be used as the directors of the hospital may direct until a contagious department can be established with it and additional funds. Miss Lord was a nurse in an eastern hospital at the time of her death.

MEDICAL SOCIETY NOTES.

The regular meeting of the Rock Island Medical Society was held at the Manufactures hotel in Moline. Supper was served at 7 o'clock. followed by a short business session. A paper on "Our County Medical Society," prepared by Dr. W. H. Ludewig, was read by the secretary, Dr. W. D. Snively. Dr. Hollowbush presented a report of the meeting of the State Medical Society.

Fifteen members of the Lake County Medical Society addressed a petition to the supervisors protesting against the continuance of the plan followed the last six months of engaging one physician to attend to all the county poor at the rate of $200 for six months. They made the following suggestions: First—Appropriate a certain sum, say, $5,000, for medical services and medicine for the poor of the county for one year. Second—Have no one man or two men appointed to do this work, but let every poor person have the choosing of his own phy-

sician. Three—At the end of the year divide this appropriated sum pro-rata among the doctors who have had indigent patients, provided that no one doctor receives more than 5 per cent. of such appropriated sum. Four—Let all hospital bills be paid in full out of said appropriation before the pro-rata division to the doctors is made.

(Signed) L. H. Tombaugh.
W. C. Bouton.
W. H. Watterson.

CHANGE OF LOCATION.

Dr. John T. Myers has left for Petersburg, Ill.

Dr. Loran E. Orr has removed from Hull to Tallula, Ill.

Dr. A. L. Kasburn has removed from Adrian to Ferris, Ill.

Dr. W. G. Dufour has removed from Oquawka to Chenoa, Ill.

Dr. W. G. McDeed has removed from Newton to Sterling, Ill.

Dr. William Patch has removed from Emington to Coleta, Ill.

Dr. E. C. Duncan has removed from Flora, Ill., to Vincennes, Ind.

Dr. G. M. Tyrrell has removed from Elizabeth to Scales Mound, Ill.

Dr. J. P. Miller has removed from Chalfin Bridge to Valmeyer, Monroe County, Illinois.

Dr. Frederick H. Martin, of Libertyville, Ill., has left this location and will locate in Colorado or west.

MARRIAGES.

George Tankersley, M.D., of Owaneco, Ill., to Miss Grace E. Piper July 25.

Karl A. Danell, M.D., to Miss Matilda Eliason, both of Chicago, June 24.

Ormand E. Hutchins, M.D., to Miss Gene J. Fairfax, both of Warsaw, Ill., July 7.

Charles M. Allison, M.D., Canton, Ill., to Miss Fern Barnes of Paulding, Ohio, May 1.

Charles E. Scullin, M.D., Peoria, Ill., to Miss Grace Barracks, at Franklin, Ind., June 22.

William H. Streng, M.D., of Spring Grove, Ill., to Miss Ada Richardson of Richmond, Ill.

Erwin Staner Hottinger, M.D., Chicago, Ill., to Miss Estelle M. Flannagan of St. Louis, June 19.

Walter T. Venn, M.D., to Miss Maude Eagleston, both of Aurora, Ill., at Crown Point, Ind., June 16.

Thomas Pollock Ranney, M.D., Chicago, to Miss Bertha Kuehn, of Eveleth, Minn., at Duluth, June 26.

ROBERT ELLIOTT GRAVES, M.D., and Miss Angeline Loesch, both of Chicago, June 30, 1909, at Spring Lake, Mich. Residence after Nov. 1, 52 Hazel Avenue.

DR. E. L. H. BARRY and Mrs. Eletta Windsor, prominent Jerseyville people, eloped to Alton Wednesday, June 23, and were married. Dr. Barry confesses to 65 years and his bride to about 50.

DEATHS.

SIDNEY L. FULLER, M.D., Chicago Medical College, 1861; died at his home in Chicago, June 16, from uremia, aged 71.

B. F. DARBY (License, years of practice, Ill., 1878) died at his home in Paris, Ill., March 4, from paralysis, aged 82.

NELSON P. WALTERS, M.D., National Medical University, Chicago, 1905; died at his home in Evanston, Ill., June 24.

JOHN R. SMITH, M.D., Eclectic Medical Institute, Cincinnati, 1881; died at his home in North Carmi, Ill., June 27, aged 59.

JOHN W. STONE (License, Ill.; years of practice, 1877) died at his home in Springerton, Ill., January 11, from paralysis, aged 68.

WILLIAM ANDREW CHATTERTON, M.D., a homeopathic practitioner of Elgin, Ill.; died in that city May 26 from angina pectoris, aged 68.

SIMON JUMPER, (License, Ill.; years of practice, 1877) died at his home in Marshall, Ill., Nov. 9, 1908, from heart disease, aged 82.

JAMES MCRUARK, M.D. McDowell Medical College, St. Louis, 1852; died at his home in Willisville, Ill., Jan. 20, 1908, from senile debility, aged 84.

LEVI W. CARTER, M.D., Hahnemann Medical College, Chicago, 1871; of Peoria; died at the Proctor Home in that city, June 23, from paralysis, aged 74.

SENECA D. E. GURNEY, M.D., Memphis (Tenn.) Medical College, 1854, was shot and killed by his insane son at his home in Quincy, Ill., June 27 ,aged 79.

MELVIN F. HOWE, M..D., Hahnemann Medical College, Chicago, 1888; of Lake Charles, La., died at the home of his brother near Marion, Iowa, July 5, aged 43.

JOHN EVANS TUTTLE, M.D., Rush Medical College, Chicago, 1868; formerly a practitioner of Myersville, Ill., died at his home in Danville, Ill., Nov. 20, 1908, from angina pectoris, aged 68.

MONROE S. LEECH, M.D., Eclectic Medical Institute, Cincinnati, 1871; Rush Medical College, Chicago, 1882; a veteran of the Civil War; died at his home in Chicago, June 24, from nephritis, aged 61.

JOSHUA SWIGERT, M.D., Washington University, Baltimore, 1863; formerly of Brazil, Ind., died in the Cook County Institution, Dunning, Ill., May 3, from exhaustion, due to chronic morphinism, aged 71.

GEORGE M. FOX, M.D. Castleton (Vt.) Medical College, 1851; once president of the board of trustees of La Grange, Ill.; from 1864 to 1866 physician of Cook County; died at his home in La Grange, July 14, aged 80.

ALEXANDER WILEY MCCLINTOCK, M.D., Miami Medical College, Cincinnati, 1895; formerly of Cisna Park, Ill.; some time member of the Ford-Iroquois Medical Society; died at his home near Phoenix, Ariz., June 27, from tuberculosis, aged 42.

SEBERN J. LAYMAN (License, Ill.; years of practice, 1878); assistant surgeon of the Eighteenth Illinois Volunteer Infantry during the Civil War; local surgeon at Tamoroa for the Illinois Central Railroad for many years; died at his home June 27, aged 72.

JOHN GROVE SPEER, M.D., Transylvania University, Lexington, Ky., 1830; for a time probate judge of Macon county, Illinois, and a resident of Decatur, Ill., and later a practitioner of Floydsburg, Ky., died at the home of his son in Alton, Ky., from influenza, May 2, aged 100.

Y. D. SCALES, M.D., of Springfield, Ill., died July 21, 1909, at the St. John's Hospital, aged 65 years. Dr. Scales served as surgeon in the Confederate Army and had practiced at Roodhouse, Lincoln, Va., and Springfield, Ill. He was never connected with any local medical society.

WILLIAM M. TOMLINSON, M.D., Transylvania University, Lexington, Ky., 1849; of Wilmette, Ill.; at one time a member of the Chicago Board of Health and a member of the local board of United States Pension Examining Surgeons; was run over by a train at Wilmette and killed June 28, aged 81.

LUCIAN LAVASSA LEEDS, M.D., Rush Medical College, Chicago, 1856; a member of the American Medical Association and Brainerd District Medical Society; for fifty-seven years a practitioner of Illinois; city councilman of Lincoln; for twenty-six years a member of the board of education, and for twelve years its president, died at his home in Lincoln, June 19, aged 78.

JOHN WRIGHT, M.D., Medical College of Ohio, Cincinnati, 1854; formerly of Clinton, Ill., a member of the American Medical Association; charter member of the Dewitt County (Ill.) Medical Society; a life member of the Illinois State Medical Society and its president in 1890; surgeon of the One Hundred and Seventh Illinois Volunteer Infantry, and later brigade and division surgeon during the Civil War, died at his home in Long Beach, Cal., May 21, from heart disease, aged 83.

JOSEPH ROBBINS, M.D. Jefferson Medical College, Philadelphia, 1861; a member of the Illinois State Medical Society; once president of the Adams County Medical Society; a member of the Tri-State Medical Society; for several years a member of the Quincy Board of Education; from 1901 to 1902 superintendent of the Jacksonville (Ill.) State Hospital; physician and surgeon to Blessing Hospital, Quincy, and president of the medical staff; formerly president of the Quincy Medical Library Association; of Quincy, Ill.; died at Blessing Hospital in that city July 20, 1909, from cancer, aged 75 years. Dr. Robbins had suffered for several years with cancer of the rectum and bore his affliction with remarkable fortitude. Dr. Robbins had not only been prominent in medicine, but was an authority in Masonic lore and a politician of state wide

renown. He was a candidate for governor against John R. Tanner in 1906. He served as superintendent of the insane hospital at Jacksonville, Ill., for about one year in 1901. He presented his library recently to the Adams County Medical Society. Practically his whole personal life had been spent at Quincy, where he was greatly beloved as a physician and citizen.

Book Notices.

ANNALS OF SURGERY.

This valuable surgical journal inaugurates its fiftieth volume by the production of an edition of 366 pages containing 26 original memoirs read at the last meeting of the American Surgical Association. The character of the papers and the form in which it is issued makes this one of the most interesting surgical journals ever issued from the American press. The "Annals of Surgery" easily stands first in the world as the best publication exclusively devoted to surgery.

THE AMERICAN POCKET MEDICAL DICTIONARY. New (sixth) edition. Edited by W. A. Newman Dorland, M.D. 32mo of 598 pages. W. B. Saunders Company, 1909. Flexible morocco, gold edges, $1.00 net.

So rapidly have new terms been introduced into the science of medicine that such a volume as is offered by W. B. Saunders Company becomes a necessity to every practitioner who would keep abreast of the times. This dictionary is strictly up to date and worthy of commendation.

SAUNDERS' POCKET MEDICAL FORMULARY. By William M. Powell, M.D., of Philadelphia. Ninth edition, thoroughly revised and enlarged and adapted to the eighth revision of the U. S. Pharmacopeia. W. B. Saunders Company, 1909.

THE POCKET FORMULARY. By E. Quin Thornton, M.D., Philadelphia. Ninth edition. Lea & Febiger, Philadelphia and New York.

These two pocket formularies are similar in size and value and each complements the other in many particulars so that both of them will be found valuable to the busy practitioner who has heretofore possibly obtained his therapeutic hints from the advertising matter supplied by proprietary houses. Many valuable therapeutic hints will be found in both of these volumes, and we recommend either or both of them highly to our readers.

HANDBOOK OF DISEASES OF THE RECTUM. By Louis J. Hirschman, M.D., Detroit, Mich., with 147 illustrations, mostly original, including two color plates. C. V. Mosby Medical Book and Publishing Company, St. Louis, 1909. Price, $4.00.

In this volume of 375 pages Dr. Hirschman has collected all of the latest data concerning diseases of the lower bowel, including a consideration of the parasites which inhabit that portion of the intestinal tract. All the latest methods of examining and operating on the diseases of this region are carefully described and illustrated in this book.

MYOMATA OF THE UTERUS. By Howard A. Kelly, M. D., Professor of Gynecologic Surgery at Johns Hopkins University, and Thomas S. Cullen, M.B., associate. Large octavo of 700 pages, with 388 superb original illustrations by August Horn and Hermann Becker. Philadelphia and London: W. B. Saunders Company, 1909. Cloth, $7.50 net; half morocco, $9.00 net.

This latest work from the Department of Gynecology of Johns Hopkins University is a worthy successor to the magnificent publications which have preceded it both in the completeness of considering the subject, descriptive matter and illustrations. The work is without a parallel in any language. No one pretending to do abdominal surgery can afford to be without this volume.

BIER'S HYPEREMIC TREATMENT. By Willy Meyer, M.D., and Prof. Victor Schmieden. The new (second) edition, enlarged. Octavo of 280 pages, illustrated. W. B. Saunders Company, 1909. Cloth, $3.00 net.

Professor Meyer, in his second revised edition of this work, has had the valuable assistance of Professor Schmieden, Professor Bier's assistant at the University of Berlin. No detail of practice has created more interest than has the hyperemic treatment so fully developed by Professor Bier, and its application in all departments of medicine and surgery is thoroughly outlined in this new and enlarged edition. Probably the newest application is its use in the treatment of seasickness by the application of an elastic band around the head. Our readers will find this work satisfactory in every way.

VACCINE AND SERUM THERAPY. By Edwin Henry Schorer, B.S., M.D., Assistant Professor of Parasitology and Hygiene, University of Missouri. Illustrated. C. V. Mosby Co., St. Louis, 1909. Price, $2,00.

This work is thoroughly up-to-date and important to the average practitioner who needs just the information contained in it for the intelligent administration of the newer forms of therapy. It gives an independent view of the value of the serum and vaccine not influenced by the statements and recommendations common to proprietary laboratories, enthusiasts and exploiters. Considerable space has been given to opsonins, the opsonic index and the importance of opsonins in health and disease. This work will furnish to the medical student and practitioner information which may lead him to a better understanding of the nature of infections and the subjects of immunity and active and passive immunization.

TUBERCULOSIS. A Preventable and Curable Disease. Modern methods for the solution of the tuberculosis problem. By S. Adolphus Knopf, M.D., New York; with 115 illustrations. 8vo. Price, $2.00 net. Moffat-Yard & Co., New York.

This volume of nearly 400 pages has as a frontispiece a photograph of Professor Robert Koch, the German scientist, who was the founder of modern phthisio-therapy by becoming the discoverer of the cause of the disease. This work appeals to all classes of citizens and should receive a hearty welcome from the profession, from statesmen, philanthropists and noble men and women everywhere who by their unselfish labors will be able to assist in wiping out the disease. The price of the work is extremely reasonable and we are glad that the author believes the ultimate eradication of tuberculosis is in sight. Such a book as he has written will do much to bring about that delightful consummation.

DIET IN HEALTH AND DISEASE. By Julius Friedenwald, M.D., Professor of Diseases of the Stomach in the College of Physicians and Surgeons, Baltimore, and John Ruhräh, M.D., Professor of Diseases of Children in the College of Physicians and Surgeons, Baltimore. Third revised edition. Octavo of 764 pages. Philadelphia and London: W. B Saunders Company, 1909. Cloth, $4.00; half morocco, $5.50 net.

"Our aim has been to make a practical handbook for every day use, and to this end have included material from many sources, all of which we trust has been duly acknowledged in the text. The articles on milk and alcohol have been rewritten, and additions made to the articles on tuberculosis, the salt-free diet, rectal feeding, the caloric needs of infants, and others too numerous to mention. Several useful tables, showing the caloric value of foods, have been added, as well

as Winton's valuable table showing the composition of diabetic foods. We have also inserted a short account of the simpler methods used to detect certain food adulterations and preservatives."

THE PRACTICAL MEDICINE SERIES, comprising ten volumes on the Year's Progress in Medicine and Surgery. Under the general editorial charge of Gustavus P. Head, M.D., Professor of Laryngology and Rhinology, Chicago Postgraduate Medical School. Volume I, General Medicine. Edited by Frank Billings, M.S., M.D., head of the Medical Department and Dean of the Faculty of Rush Medical College, Chicago, and J. H. Salisbury, A.M., M.D., Professor of Medicine, Chicago Clinical School. Price $1. Volume II, General Surgery. Edited by John B. Murphy, A.M., M.D., LL.D., Professor of Surgery in the Northwestern University, Attending Surgeon and Chief of Staff of Mercy Hospital, Wesley Hospital, St. Joseph's Hospital and Columbus Hospital, Consulting Surgeon to Cook County Hospital and Alexian Brothers Hospital, Chicago, Ill. Chicago: The Year Book Publishers. Price $2.

The volumes are two of a series of ten issued at about monthly intervals and covering the entire field of medicine and surgery, each volume being complete for the year prior to its publication on the subject of which it treats. Price of the series of ten volumes, $10.00. This series is published primarily for the general practitioner; at the same time the arrangement in several volumes enables those interested in special subjects to buy only the parts they desire.

MEDICINE IN CHAMPAIGN COUNTY. A historical sketch by Charles B. Johnson, M.D. Fiftieth anniversary souvenir edition of Champaign, Ill., 1909, Gazette-Press, Champaign.

Dr. C. B. Johnson, of Champaign, has done a great work for the history of medicine in his county on the occasion of the fiftieth anniversary of the county society by assembling the photographs of the majority of the practitioners who have ever been located in that county with biographical sketches, in a paper covered book of 83 pages. Champaign county has been fortunate in having a large number of active, influential, patriotic and devoted medical men who have shed lustre on the place of their residence and the profession with which they were identified. Among them has been Dr. Alexander T. Darrah, president of the state society in 1882; Dr. Johnson himself, who has been a member and president of the State Board of Health of Illinois; Dr. James Core, a member of the legislature, to say nothing of those who served valiantly as surgeons in the war of the rebellion and in various public offices before and since that time. The publication of this history has been a labor of love on the part of Dr. Johnson which might well be imitated by some one in every county in the state, and if this were done, a great deal of valuable historical material would be assembled for the coming generations, which otherwise would be forever lost. We hope that every county society in the state will take up this matter and elect a historian at once to issue such a book as did the Champaign county society.

DANIEL DRAKE AND HIS FOLLOWERS. Historical and biographical sketches by Otto Juettner, A.M., M.D. Royal 8vo; pages, 496; illustrated. Price, $5. Harvey Publishing Company, Cincinnati, 1909.

Daniel Drake, pioneer, author, founder of medical colleges, professor in five different schools in four different states, traveler over the entire Mississippi Valley, poet, fighter, an intensely interesting character in many ways, is here depicted by Dr. Juettner in a volume of nearly 500 pages, which includes sketches of a majority of the medical men who have practiced in Cincinnati and Ohio and several adjoining states and makes a volume of intense interest to any one who cares for the medical history of the West.

There are scores of medical men practicing in Illinois who received their education in Cincinnati who will read this work from the first to the last page with

avidity. The book itself is a model in nearly every way of what a history of a medical center should be. Fortunately, a great many of the characters depicted lived long enough ago to be spoken of impartially. The strength, the weakness, the peculiarity, the hopes, aspirations and failures of each are drawn with a facile pen.

The establishment of medical education in the West has many of the features of a romance tinctured with tragedy, comedy and farce of the broadest nature.

Drake, after founding the Medical College of Ohio, was, two years later, expelled from his own school and practically never secured a place again, although, for a short period, he lectured in the college. Some of his best work was done in Lexington and Louisville, Ky., and Philadelphia, but he always returned to Cincinnati, the place of his first love, where he exerted, after all, his greatest influence.

We commend the work of Dr. Juettner in the highest terms and hope it will be so successful that a new and larger edition will shortly be forthcoming. Dr. Juettner and others in Cincinnati have formed a society for the study of the medical history of the West, and it is to be hoped that similar histories of other medical centers, such as Chicago and St. Louis, will soon be written along the lines of this work. There should be some one collecting material for such stories at once in order that the knowledge yet existing in persons yet living may be set down before it is forever too late. What an interesting story could be told of the pioneers of St. Louis; Hodgen, McDowell (who is mentioned in Juettner's work), Gregory, Bolisniere, and others of that metropolis, and of Davis, Allen, Ingalls, Hollister, Fenger, Senn, Rauch and others, of Chicago.

We hope that another writer of Dr. Juettner's descriptive powers will appear in these and other centers before very long.